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October 2023

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Summary

This paper probes the relationship between sources of Covid-19 information and adherence to preventive measures in Nigeria, a context characterised by fake news, hate speech, and other forms of disinformation. While this relationship in Nigeria is relatively well studied, little discrete analytical attention has been given to the actor and platform components of information sources. Yet, it is important to consider the platforms people use when seeking Covid-19 information, the actors they trust to provide reliable information, and their compliance with preventive measures. We used data from a 1,000-household telephone survey conducted in Lagos, Nigeria to understand the relationship between information platforms and actors and adherence to Covid-19 preventive measures. We found that male and female respondents turned to similar platforms and trusted similar actors to provide reliable information, irrespective of the platforms the actors used. We also found that the trusted platforms are related to respondents' adherence to preventive behaviours but are unrelated to their view of the trustworthiness of the Covid-19 vaccination programme. Policy actions should focus more carefully on cultivating credible information actors across formal and informal platforms to promote increased adherence to preventive behaviours and willingness to take vaccines.

Keywords

Covid-19, compliance, information, Nigeria, trust.

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Acknowledgements

Acronyms

AA	Action Alliance
APC	All Progressives Congress
APGA	All Progressives Grand Alliance
KP	Kowa Party
LP	Labour Party
NBC	National Broadcasting Commission
PDP	Peoples Democratic Party
WHO	World Health Organization

1. Introduction

This paper probes the relationship between sources of Covid-19 information and adherence to preventive measures in Nigeria, a context characterised by fake news, hate speech, and other forms of disinformation before the pandemic. The novel coronavirus, also known as Covid-19, hit the world when disinformation had already become a global concern. The newness of the virus accentuated the need for information and thus placed information sources at the centre of efforts to control its spread. Thus, misinformation was seen as a threat to Nigeria's ability to respond to the challenges of Covid-19 (Adegoke 2020; Kazeem 2020; Nebe 2020). Nigeria's Minister of Information, Alhaji Lai Mohammed, noted that Covid-19-related fake news distracted the government's containment efforts (Vanguard 2020). These positions highlight the significance of information sources in the efforts to contain the spread of the virus.

While several studies have examined the relationship between Covid-19 information sources and adherence to preventive measures, their composite conceptualisation of information sources needs to be more responsive to the complexities that define the current information landscape. The pandemic placed the responsibility of information provision on many actors, while others assumed the responsibility voluntarily (Hassan 2020). Given the technicality of disease-related information, the trustworthiness of those providing it and the nature of the platforms they use are important. Existing studies have focused on information actors and platforms or exclusively on either, even though the difference between the two is critical to health information-seeking (Dutta-Bergman 2003). This study delineates the two to establish their discrete relationships with adherence to Covid-19 preventive measures and vaccine-related behaviours in the context of a pandemic that has affected males and females differently (Peckham *et al*. 2020; Olusola-Makinde and Makinde 2021).

2. Defining information sources

This study defines information sources as comprising information actors and platforms. Information actors, formal or informal, are responsible for making the information available on platforms. Formal and informal information actors are distinguished based on their technical knowledge of an issue, whether they possess policy authority over an issue, and their distance from the people. In relation to Covid-19, information actors would be regarded based on their qualifications and experience. For instance, scientists, such as those in the field of virology and epidemiology, and health workers, such as doctors and nurses, have varying degrees of knowledge of the virus and its transmission. Also, ministries, departments, and government agencies such as centres for disease control (CDC) in different countries and international organisations such as the World Health Organization (WHO) have the authority to make and implement policies related to the virus. We defined these as formal information actors. Informal actors are largely interpersonal. They are close to the people but largely have little or no technical knowledge of the issue or no policy authority. We have family, friends, and neighbours in this informal actor category.

Information platforms provide the meeting point for information actors giving and seeking information. These, too, can be formal or informal, depending on whether they are regulated or overseen by professional bodies. At the one extreme of formality are technical platforms such as scientific reports, academic journals, and traditional media such as television, radio, and newspapers, all subject to stringent regulatory measures. Besides regulation, formal and informal platforms differ in how they produce information and how the validity of the information they provide is guaranteed or enhanced. While message creation and dissemination in formal platforms are guided by regulatory codes and codes of professional ethics, no such guides exist on informal platforms. Given the regulatory demands, formal platforms such as television, radio, and newspapers are expected to feature mainly actors with knowledge of the virus and its containment and those with policymaking authority. At the other extreme are various non-mediated, person-to-person, face-to-face information exchanges among household members, relatives, friends, and neighbours (Hwang 2020). Notably, opportunities for exchanging information informally have been extended through instant messaging apps and social media platforms, which in many countries remain largely unregulated. However, it is important to note that owner companies are increasingly moderating social media platforms. That notwithstanding, ease of access, primarily via mobile devices, rapidity of information dissemination, and access to a large number of people are some of the appeals that have continued to drive the use of social media platforms.

Despite this categorisation, some entities function both as actors and as platforms. In this category are the mass media platforms that present the views of others and take positions on issues through editorials and commentaries. Some social media platforms have functioned in this dual capacity in the context of the Covid-19 pandemic. While they yielded themselves as platforms for individuals, groups, governments, and organisations to propagate Covid-19 information, they also engage in the same. Facebook launched a Coronavirus (Covid-19) Information Hub for Media, targeting various media platforms that provided the public with Covid-19 information from verified sources such as the WHO, United Nations Children's Fund (UNICEF), and country ministries of health to ensure access to accurate information (Facebook 2020). For its part, Twitter (now X) conducted fact-checking of Covid-19 information shared on the platform, marking those that contained misinformation. It attached to tweets designated labels and warning messages to alert users to the potential of such tweets to spread misinformation (Roth and Pickles 2020).

3. The Nigerian Covid-19 information landscape

Whereas the WHO declared Covid-19 a pandemic on 11 March 2020 (WHO 2020), Nigeria had earlier declared fake news, misinformation, and disinformation an epidemic, constituting a security threat. In 2018, Nigeria's Minister of Information, Alhaji Lai Mohammed, declared fake news and hate speech a threat to national security and outlined measures to deal with it (Vanguard 2018). Consequently, the legislative arm of government drafted two bills, the National Commission for the Prohibition of Hate Speeches (Est, etc) Bill, 2019 and the Protection from Internet Falsehoods and Manipulations and Other Related Matters Bill, 2019, whose primary objectives were to address the problem of disinformation (Oladapo and Ojebode 2021). The two bills aimed to regulate activities on social media, similar to a previous bill, Frivolous Petitions Bill, 2015, which the Nigerian Senate withdrew in 2017 (Oladapo and Ojebuyi 2017).

Although state actors devoted attention to social media as primary sites for disinformation, they also targeted mass media, especially radio and television. In 2018, the National Broadcasting Commission (NBC) sanctioned radio and television stations for 260 cases of hate speech and 347 cases of unverifiable claims (Ojebode 2018). The sanctions were imposed after the (perceived) erring stations had been warned at least once. The NBC reviewed the broadcasting industry regulatory code specifically to address the problem of fake news and hate speech, highlighting the magnitude of the perceived threat (Onwuaso 2018; Nigeria Communications Week 2019). The misinformation challenge was broader than the government's perception of the threat to national security. In February 2020, Quartz Africa reported that Nigeria's greatest challenge in the battle against Covid-19 would be overcoming misinformation (Kazeem 2020). Although the challenge of fake news is a global concern, the situation is much worse in Nigeria, where fake news is reported to filter from social media platforms into legitimate news websites (Gikandi 2020).

Thus, the Covid-19 pandemic in Nigeria was both a health challenge and an information problem. Nevertheless, more than anecdotal evidence is needed to prove that exposure to information and adherence to preventive measures correlate. Therefore, we relied on data from a 1,000-household telephone survey conducted in Lagos, Nigeria to probe that assumption. Our choice of Lagos was informed by the fact that the state had the highest Covid-19 burden in terms of confirmed cases (35 per cent of Nigerian cases) and deaths (21 per cent of Nigerian deaths) at the time the study began on 5 November 2020 (Nigeria Centre for Disease Control 2021). Lagos is also central to Nigeria's response to

health emergencies such as disease outbreaks, being the country's major
international entry port and economic capital.

4. Popularity and trustworthiness of Covid-19 information sources

Across the world, the sources from which people receive information became a more prominent issue in the wake of Covid-19. Information became essential, especially during lockdown (Campos-Castillo 2021). Evidence suggests that the Covid-19 information landscape is complicated, with multiple actors utilising multiple sources to inform the public or seek information about the virus (Houston *et al*. 2021; Tang and Zou 2021). Recent studies cite mainstream media, especially television, as the most used source of Covid-19 information in many countries. A study conducted in the United States found that participants accessed Covid-19 information from television news more than from friends and family, health-care providers, and social media, specifically Facebook (Houston *et al*. 2021). In the Wuhan region of China, where the virus was believed to have originated, a study found that respondents relied more on television for Covid-19 information, alongside government social media accounts and state media (Tang and Zou 2021). The findings are consistent with those of Yu and Jiang (2020), who indicated television as the most preferred source of Covid-19 information among Chinese people aged 50 and above. Television news reports were rated high as sources of Covid-19 information in Italy and Germany (Brailovskaia *et al.* 2021). Similarly, Xie, Zang and Ponzoa (2020) found that Chinese students depended more on mainstream Chinese and foreign media for Covid-19 information and knowledge acquisition than on social media. However, in the United States, whilst non-health workers and health workers who did not hold decision-making positions in clinics rated television news high as a source of Covid-19 information, health workers in decision-making positions did not (Sathianathan *et al*. 2020). Notably, the preference for mainstream media is higher among those older in age (Yu and Jiang 2020; Chu *et al*. 2021).

Whilst television news has been shown by the studies above to be an important source of information during the pandemic, social media has been at the heart of the transformation that has happened on how disease-related information is shared (Manganello, Bleakley and Schumacher 2020). In a two-country comparative study, about 50 per cent of participants in Germany and about 60 per cent in Italy frequently used social media as a Covid-19 information source (Brailovskaia *et al*. 2021). In both countries, social media was used more frequently than print sources, but less frequently than official sites and news reports on television (*ibid*.). Yu and Jiang (2020) identified WeChat, a social media platform, as a highly preferred source of Covid-19 information in China. Among health workers in 17 Latin American countries, social media networks come next only to specialised journals as the most used

sources of information on Covid-19 (Ortiz-Martínez *et al*. 2021). The authors also noted that scientifically proven information about Covid-19 was shared on social media platforms. In Nigeria, health workers were found to rely on social media just as they do on television as primary sources of Covid-19 information (Ejeh *et al*. 2020). For Generation Z in the UK (those born between 1997 and 2012), however, social media attracted an outright discountenance (Liu *et al.* 2021). This rejection was mainly caused by fear of Covid-19 and social media fatigue, which resulted from perceived information overload (*ibid*.). Meanwhile in general, educated people were found to rely on social media more than non-educated (Yu and Jiang 2020).

Public or official websites of government or government institutions also featured prominently as sources of Covid-19 information among students in Norway (Dyregrov *et al.* 2020) and Egypt (Shehata 2021), among health-care workers and non-health-care workers in the United States (Sathianathan *et al*. 2020), and for residents at the epicentre of the virus in Hubei Province, China (Tang and Zou 2021). In Italy and Germany, official websites constituted a primary source of Covid-19 information (Brailovskaia *et al*. 2021). Other sources include general online searches (Chesser, Drassen Ham and Keene Woods 2020) and online newspapers, which are clearly distinguished from news websites of mainstream media (Tang and Zou 2021).

On actors, health workers featured most prominently in many countries. This is expected given the need for specialist information that the Covid-19 pandemic triggered. In separate studies conducted in China and Uganda, health professionals were among the most preferred information actors (Amodan *et al*. 2020; Lu *et al*. 2020; Zhong *et al*. 2021). Other actors indicated in existing studies as being important information sources include government agencies (Lu *et al.* 2020; Sathianathan *et al*. 2020), scientists and experts (Battiston, Ridhi Kashyap and Rotondi 2021), mass media and social media (Lu *et al*. 2020; Sathianathan *et al*. 2020), neighbours (Chu *et al*. 2021), and family and friends (Lu *et al.* 2020; Shehata 2021).

5. Information source and adherence to Covid-19 preventive measures

Varied levels of adherence to Covid-19 preventive measures have been observed worldwide, informed by various factors, including trust in authorities, type of government (whether democratic, authoritarian, or a mix), and the type of health-seeking behaviour built over time. Early studies show that the level of compliance in democratically stable countries such as New Zealand and Switzerland was high, while that experienced in fragile and conflict-affected settings such as Ethiopia and the Democratic Republic of the Congo (DRC) was low. Overall, a high level of adherence was recorded in countries such as New Zealand, Switzerland, Palestine, and Uganda. However, Ethiopia and the DRC recorded low adherence (Bante *et al*. 2021; Abeya *et al*. 2021; Ditekemena *et al*. 2021). In Nigeria, the level of adherence was mixed, with high adherence observed in some places and low in others (Nnama-Okechukwu, Chukwu and Nkechukwu 2020; Bolarinwa *et al*. 2020; Adesegun *et al*. 2020; Ejeh *et al*. 2020; Oyeyemi *et al*. 2021).

Some studies established a connection between Covid-19 information sources and adherence to the prescribed preventive measures. In a comparative study of the United States, South Korea, and Kuwait, Al-Hasan, Yim and Khuntia (2020) found that agents such as families, friends, and other social sources influenced respondents' adherence level more than the traditional media of television and newspapers did. The authors observed that information sources influenced adherence levels among the respondents just as much as their perception of government did. Contrarily, no such connection was found among Nigerian respondents. Specifically, Adesegun *et al*. (2020) found no significant relationship between adherence level and respondents' Covid-19 information source. However, their conception of sources of information as traditional media and internet media is problematic since it ignores the complexity of the sources of information available in the context of Covid-19.

Also, available findings on information sources and intention to take the Covid-19 vaccine vary. A study conducted in the United States found that participants who trusted health-care professionals and health officials the most were more willing to take the vaccine (Malik *et al*. 2020). However, social media is primarily associated with an unwillingness to accept the Covid-19 vaccine (Puri *et al*. 2020). As Hwang observes, 'those who assign more value to social media are more likely to doubt the perceptions that the vaccine is effective, demonstrating that social media may play a malevolent role in building perceptions not only of vaccine safety but also efficacy' (2020: 733). Hwang notes the same trend among interpersonal sources such as family, relatives, and friends (*ibid.*).

For adherence to preventive measures and intention to take the Covid-19 vaccine, informal sources are emerging as significant. While they seem to encourage adherence to preventive measures, they also seem to discourage willingness to take the Covid-19 vaccine.

6. Methods

The study was based on a 1,000-household telephone survey, with the respondents drawn from the 57 local government and local council areas of Lagos State, Nigeria, between October 2020 and March 2021. Two people, a male and a female, aged at least 18 years, were sampled from each household, making 2,000 respondents. The respondents were selected from a database hosting 5,018,030 phone numbers of Lagos State residents aged at least 18 years, who had participated in previous surveys conducted by Practical Sampling International (a survey company based in Lagos, Nigeria), and who had agreed to participate in future studies. A randomised sampling technique without replacement was adopted, and participant recruitment continued until the required number was reached. The first wave of Covid-19 in Nigeria peaked on 1 July 2020 with an average of 790 cases per day, while the second wave peaked on 23 January 2021, averaging 2,464 cases per day. At the start of the survey on 5 November 2020, Nigeria recorded 180 positive cases of Covid-19 per day, and at its end on 16 March 2021, the country recorded 179 cases per day. Thus, the Covid-19 situation at the beginning and end of the survey was similar in terms of daily incidence.

We categorised Covid-19 information sources into formal and informal platforms and actors. Formal platforms included mass media such as newspapers, radio, and television. Informal platforms were divided into two categories: (1) mediated informal platforms such as informational calls, text messages, WhatsApp groups, and other social media platforms (e.g. Twitter, Facebook, and Instagram); and (2) unmediated, face-to-face conversations such as talking to men and women in the household or in the neighbourhood. The respondents were asked to identify, in order of preference, the three leading platforms from which they received Covid-19 information. They were also asked how much they trusted formal information actors such as government, doctors, and the traditional media of radio, television, and newspaper; and informal information actors of family and friends, neighbours, and social media such as Facebook, Twitter, Instagram, and WhatsApp. Responses were rated on a trustworthiness scale of 1 to 5 with 'can't tell' coded 1, 'very untrustworthy' 2, 'somewhat untrustworthy' 3, 'somewhat trustworthy' 4, and 'very trustworthy' 5.

We also measured adherence to two aspects of preventive measures: behavioural and vaccination. We asked the respondents if they washed hands more frequently than usual; used a mask or other face covering when going out; avoided meeting relatives, friends, and neighbours; and avoided going to [open] markets, as directed by Nigeria's Coronavirus Disease (Covid-19) Health Protection Regulations 2021. In addition, we asked if they had done each of the four behaviours 'a lot' 1, 'a little bit' 2, or 'have not done it at all' 3. We asked the

respondents to indicate the extent to which they would consider it trustworthy if the government rolled out the Covid-19 vaccination programme. The response options were categorised as 'extremely trustworthy' 5, 'somewhat trustworthy' 4, 'neither trustworthy or untrustworthy' 3, 'somewhat untrustworthy' 2, and 'extremely untrustworthy' 1. The data was subjected to descriptive analysis presented in frequency, percentage, and charts, and Pearson's Chi-Square and Spearman's correlation analyses, with level of significance established at both 0.01 and 0.05. Percentages are presented alongside or in parentheses, where they are presented alongside frequency counts in tables.

7. Findings

7.1 Respondent characteristics

The sampled population was generally young, with the majority aged between 18 and 45. Only a few were in the Covid-19 most vulnerable age group of 61 and above. Most respondents were Christians (74.6 per cent), followed by Muslims (25.1 per cent). Over 90 per cent of the respondents considered religion very important to them (females 50.4 per cent; males 49.6 per cent). However, most (70.9 per cent) did not feel close to any political party. The majority of those who did indicate a tie to a political party associated with either the ruling party, All Progressives Congress (APC) (females 45.2 per cent; males 54.8 per cent), or the main opposition, Peoples Democratic Party (PDP) (females 45.7 per cent; males 54.3 per cent). Only a few respondents reported no formal education (females 1.6 per cent; males 1.7 per cent). More males than females attained at least a bachelor's degree or Higher National Diploma.

Table 7.1 Respondents' characteristics

Age in years	Female	Male	Total
18–45	850 (85.0%)	787 (78.7%)	1,637 (81.9%)
46–60	118 (11.8%)	165 (16.5%)	283 (14.2%)
≥61	32 (3.2%)	48 (4.8%)	80 (4.0%)
Total	1,000	1,000	2,000

Religion	Female	Male	Total
Islam	236 (23.6%)	265 (26.5%)	501 (25.1%)
Christianity	760 (76.0%)	732 (73.2%)	1,492 (74.6%)
Hindu	1 (0.1%)	1 (0.1%)	2 (0.1%)
Other	0	1 (0.1%)	1 (0.1%)
Did not answer	3 (0.3%)	1 (0.1%)	4 (0.2%)
Total	1,000	1,000	2,000

Religiosity	Female	Male	Total
Not at all important	7 (0.7%)	5 (0.5%)	12 (0.6%)
Not very important	4 (0.4%)	10 (1.0%)	14 (0.7%)
Somewhat important	69 (6.9%)	81 (8.1%)	150 (7.5%)
Very important	911 (91.1%)	898 (89.8%)	1,809 (90.5%)
Don't know	8 (0.8%)	4 (0.4%)	12 (0.6%)
Refused to answer	1 (0.1%)	2 (0.2%)	3 (0.2%)
Total	1,000	1,000	2,000

Party	Female	Male	Total
KP (Kowa Party)	1 (0.1%)	0	1 (0.1%)
AA (Action Alliance)	2 (0.2%)	0	2 (0.1%)
Accord	3 (0.3%)	2 (0.2%)	5 (0.3%)
LP (Labour Party)	1 (0.1%)	6 (0.6%)	7 (0.4%)
APGA (All Progressives Grand Alliance)	9 (0.9%)	4 (0.4%)	13 (0.7%)
PDP (Peoples Democratic Party)	96 (9.6%)	114 (11.4%)	210 (10.5%)
APC (All Progressives Congress)	136 (13.6%)	165 (16.5%)	301 (15.1%)
None	736 (73.6%)	682 (68.2%)	1,418 (70.9%)
Other	16 (1.6%)	27 (2.7%)	43 (2.2%)
Total	1,000	1,000	2,000

Education	Female	Male	Total
Had no formal education	16 (1.6%)	17 (1.7%)	33 (1.7%)
Attended or completed primary education	48 (4.8%)	31 (3.1%)	79 (4.0%)
Attended or completed secondary education	294 (29.4%)	255 (25.5%)	549 (27.5%)
National Diploma	263 (26.3%)	204 (20.4%)	467 (23.4%)
HND/Bachelor's degree	318 (31.8%)	399 (39.9%)	717 (35.9%)
Master's degree	46 (4.6%)	77 (7.7%)	123 (6.2%)
Doctorate degree/PhD	2 (0.2%)	10 (1.0%)	12 (0.6%)
Refused to answer	13 (1.3%)	7 (0.7%)	20 (1.0%)
Total	1,000	1,000	2,000

Source: Authors' own

7.2 Overview of Covid-19 information sources

Given that the novel nature of Covid-19 heightened people's quest for knowledge about it, information sources became central to people's response to the disease. We asked respondents to indicate their three most preferred Covid-19 information platforms. We also asked them to indicate how trustworthy they considered various actors actively involved in providing information about Covid-19. Their preferred information platforms, disaggregated by gender, are presented in Table 7.2.

Table 7.2 Preferred Covid-19 information platforms

Platforms	First preference (%)		Second preference (%)		Third preference (%)	
	Female	Male	Female	Male	Female	Male
Newspaper, radio, or TV	65.4	64.2	18.7	18.8	8.5	10.1
Informational calls/messages (not sent by family/acquaintances)	9.5	8.2	22.0	23.0	21.9	24.4
Messages in WhatsApp groups	4.9	4.7	14.6	14.9	22.3	20.7
Social media (Facebook, etc.)	16.0	19.2	28.4	30.4	21.5	20.1
Talking to other men in the household	1.3	0.6	5.4	4.2	5.5	9.8
Talking to other women in the household	1.0	0.6	4.2	1.0	7.2	3.1
Talking with male friends or neighbours	0.6	1.1	1.9	6.0	2.3	7.2
Talking with female friends or neighbours	0.7	0.1	2.7	0.3	5.9	0.6
Other	0.6	1.3	2.1	1.4	4.9	4.0
Total	100	100	100	100	100	100

Source: Authors' own

Most respondents reported relying on mediated sources of Covid-19 information. Formal platforms such as newspapers, radio, and television were the most preferred sources of Covid-19 information for both females (65.4 per cent) and males (64.2 per cent). Besides the mass media, the respondents reported social media as their next most preferred platform for accessing Covid-19 information. More male (19.2 per cent) than female respondents (16.0 per cent) indicated social media platforms as their most preferred source of information. Generally, for females and males, social media and WhatsApp – isolated for its role in enabling the quick spread of falsehoods and misinformation, especially during the 2014 Ebola outbreak in Nigeria (Bakare 2020) – were the second most preferred platforms. While human-to-human platforms appear to be unpopular among the respondents, the observable gender disparities in their use are interesting. It is striking that more women (first preference: 0.6 per cent; second preference: 1.9 per cent; third preference: 2.3 per cent) than men (first preference: 0.1 per cent; second preference 0.3 per cent; third preference: 0.6 per cent) indicated preferences for Covid-19 information provided by the opposite gender.

Six actor categories were examined on the extent to which the respondents considered them trustworthy providers of Covid-19 information (see Table 7.3).

Table 7.3 Trusted Covid-19 information actors

Actor	Gender	Very trustworthy (%)	Somewhat trustworthy (%)	Somewhat untrustworthy (%)	Very untrustworthy (%)	Can't tell (%)
Government	Female	37.9	27.4	13.8	16.1	4.8
Government	Male	37.7	27.7	13.5	16.5	4.6
Doctors	Female	57.5	28.6	6.6	4.1	3.2
Doctors	Male	53.5	32.6	5.8	5.0	3.1
Family and friends	Female	30.0	47.4	14.3	5.8	2.5
Family and friends	Male	29.0	44.8	15.8	6.8	3.6
Neighbours	Female	21.8	50.1	16.5	7.8	3.8
Neighbours	Male	22.9	44.5	18.5	9.5	4.6
Mass media	Female	40.3	38.5	11.0	7.3	2.9
Mass media	Male	40.6	40.3	9.7	6.7	2.7
Social media	Female	35.0	37.1	12.9	7.6	7.4
Social media	Male	34.8	39.5	11.5	8.3	5.9

Source: Authors' own

As presented in Table 7.3, formal actors were the most trusted by both male and female respondents in the following order: doctors (females 57.5 per cent; males 53.5 per cent), mass media (females 40.3 per cent; males 40.6 per cent), and government (females 37.9 per cent; males 37.7 per cent). Among informal information actors, social media (females 35.0 per cent; males 34.8 per cent) were considered most trustworthy, although female respondents considered neighbours and family and friends 'somewhat trustworthy' more than male respondents did. Unexpectedly, despite its role as the overall authority on Covid-19 information provision, the government was regarded as 'very untrustworthy' by the highest percentage of the respondents, both males (16.5 per cent) and females (16.1 per cent).

7.3 Respondents' adherence to preventive behaviours

Non-pharmaceutical measures were central to the response to the Covid-19 pandemic in many countries. We present an overview of respondents' adherence to Covid-19 preventive behaviours.

Table 7.4 Adherence to Covid-19 preventive behaviours

Preventive behaviours	Gender	Done this a lot (%)	Done this a little bit (%)	Have not done this at all (%)	Total (%)
Handwashing	Female	92.3	7.1	0.6	100
Handwashing	Male	89.6	9.4	1.0	100
Face mask	Female	81.7	17.0	1.3	100
Face mask	Male	82.7	16.1	1.2	100
Social distancing	Female	41.4	45.8	12.8	100
Social distancing	Male	41.0	45.8	13.2	100
Avoiding crowds	Female	33.7	41.6	24.7	100
Avoiding crowds	Male	35.5	43.2	21.3	100

Source: Authors' own

The respondents were asked whether they had practised the preventive behaviours prescribed for Covid-19 more often than they used to before the outbreak of the pandemic. Again, we found a similar pattern of adherence among male and female respondents as both genders reported a high level of compliance with the two personal behaviours of handwashing and use of face masks or covering (see Table 7.4). More males (1.0 per cent) than females (0.6 per cent) reported having not engaged in handwashing, while slightly more female respondents (1.3 per cent) reported not having used a face mask compared to males (1.2 per cent). Both males and females reported low compliance with the two social behaviours (avoiding meeting relatives, friends, and neighbours and avoiding going to open marketplaces) prescribed to achieve social distancing. While more males (13.2 per cent) than females (12.8 per cent) reported never having observed avoidance of visiting relatives, friends, and neighbours, more females (24.7 per cent) than males (21.3 per cent) reported never having complied with avoidance of going to open marketplaces.

7.4 Covid-19 vaccination trustworthiness

Just before its nationwide implementation in Nigeria, we asked the respondents how trustworthy they would consider the Covid-19 vaccination programme. They rated the programme on a scale from 'extremely trustworthy' to 'extremely untrustworthy'.

Table 7.5 Covid-19 vaccine trustworthiness

Vaccine trustworthiness	Extremely trustworthy	Somewhat trustworthy	Neither trustworthy nor untrustworthy	Somewhat untrustworthy	Extremely untrustworthy
Female (1,000)	282 (28.2%)	388 (38.8%)	166 (16.6%)	78 (7.8%)	86 (8.6%)
Male (1,000)	311 (31.1%)	352 (35.2%)	178 (17.8%)	91 (9.1%)	68 (6.8%)
Total (2,000)	593 (29.7%)	740 (37.0%)	344 (17.2%)	169 (8.5%)	154 (7.7%)

Source: Authors' own

As presented in Table 7.5, most of the respondents considered Covid-19 vaccination extremely (n=593; 29.7 per cent) or somewhat (n=740; 37.0 per cent) trustworthy. Few of the respondents considered the vaccination somewhat (n=169; 8.5 per cent) or extremely (n=154; 7.7 per cent) untrustworthy. Across all categories of level of trust on vaccinations, female and male respondents were comparable.

Figure 7.1 Covid-19 vaccine trustworthiness
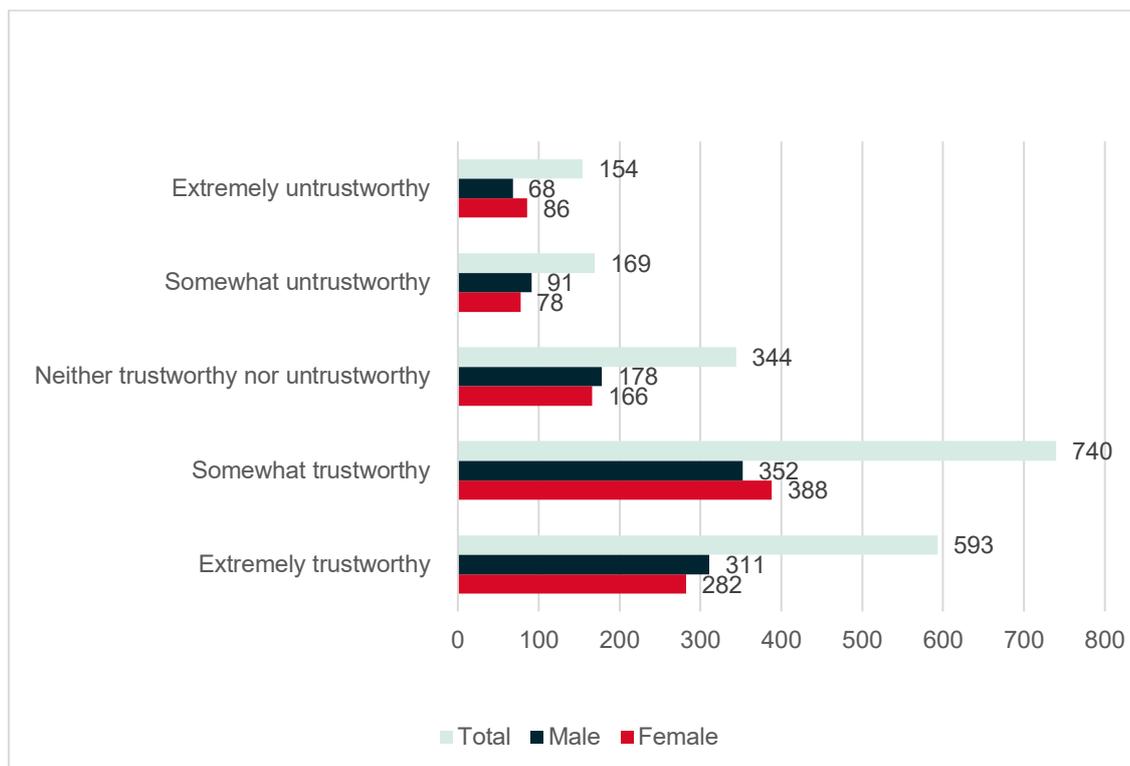
Source: Authors' own

8. Relationship between Covid-19 information platform preference and adherence to preventive measures

Having presented separately findings on respondents' preference for information platforms and trust in information sources alongside their adherence to preventive measures, we also sought to understand the relationship between the two. To do this, we used Pearson's Chi-Square correlation analysis technique to analyse the relationship between platform preference and compliance with preventive behaviour.

Table 8.1 Relationships between information platform preference and adherence to Covid-19 preventive behaviours

Most preferred information platforms	Washed hands: Male	Washed hands: Female	Used face masks: Male	Used face masks: Female	Avoided meeting relatives and friends: Male	Avoided meeting relatives and friends: Female	Avoided going to open markets: Male	Avoided going to open markets: Female
First preference	34.471* (.005)	13.359 (.646)	78.269* (.000)	28.009* (.031)	18.697 (.285)	21.579 (.157)	27.223* (.039)	18.201 (.312)
Second preference	150.593 (.000)*	24.649 (.076)	25.292 (.065)	28.889* (.025)	19.847 (.227)	27.315* (.038)	16.358 (.428)	28.223* (.030)
Third preference	31.442 (.012)*	16.175 (.441)	36.222* (.003)	11.950 (.747)	23.598 (.099)	16.228 (.437)	16.914 (.391)	24.833 (.073)

Note: Chi-Square (χ2) with p-values in brackets significant at 0.05.
Source: Authors' own.

There was no significant association between Covid-19 information platform preferences and female respondents' practice of frequent handwashing, but there was for male respondents (see Table 8.1). Using face masks was significantly associated with first and third platform preference for male respondents but with first and second for female respondents. Avoidance of meeting with relatives is not significantly associated with platform preference for males, but it is with only the second preference for females. First and second

platform preferences were significantly associated with avoidance of visiting open markets for male and female respondents, respectively.

Nevertheless, as shown in Table 8.2, Covid-19 information platform preference and respondents' trust in Covid-19 vaccination are not significantly associated for either male or female respondents.

Table 8.2 Relationship between information platform preference and respondents' trust in Covid-19 vaccination

Gender	Platform preference	Chi-Square score
Female	First preference	44.831 (0.066)
Female	Second preference	27.823 (0.678)
Female	Third preference	41.424 (0.123)
Male	First preference	37.382 (0.236)
Male	Second preference	36.021 (0.286)
Male	Third preference	39.646 (0.166)

Note: Chi-Square (χ2) with p-values in brackets significant at 0.05.
Source: Authors' own.

9. Relationship between trust in Covid-19 information actors and adherence to preventive measures

We also examined the relationship between how trustworthy the respondents considered Covid-19 information actors and the respondents' adherence to preventive measures. The findings are presented in Tables 9.1 and 9.2.

Table 9.1 Relationship between trust in information actors and respondents' adherence to Covid-19 preventive behaviours

Gender	Information actor	Washed hands	Used face masks	Avoided meeting relatives and friends	Avoided going to open markets
Female	Government	.173** (.000)	-.026 (.405)	.221** (.000)	.177** (.000)
Female	Doctors	.126** (.000)	.127** (.000)	.071* (.025)	.105** (.001)
Female	Family and friends	.097** (.002)	-.016 (.605)	.087** (.006)	.053 (.092)
Female	Neighbours	.074* (.019)	.006 (.840)	.088** (.005)	.085** (.007)
Female	Mass media	.115** (.000)	.164** (.000)	.087** (.006)	.102** (.001)
Female	Social media	.125** (.000)	.152** (.000)	.139** (.000)	.254** (.000)
Male	Government	.182** (.000)	.051 (.109)	.184** (.000)	.141** (.000)
Male	Doctors	.156** (.000)	.166** (.000)	.029 (.356)	.073* (.021)
Male	Family and friends	.081* (.011)	.019 (.552)	.070* (.028)	.044 (.166)
Male	Neighbours	.057 (.072)	.035 (.267)	.078* (.013)	.061 (.055)
Male	Mass media	.092** (.004)	.139** (.000)	.115** (.000)	.092** (.004)

Male	Social media	.151** (.000)	.111** (.000)	.174** (.000)	.158** (.000)

Note: Correlation coefficients (r) are presented with p-values in brackets significant at 0.05 with a single asterisk and at 0.01 with double asterisks.
Source: Authors' own

Trust in government correlated significantly with frequent handwashing, avoidance of meeting relatives and friends, and avoidance of going to open markets for both male and female respondents, but not with the use of face masks (Table 9.1); whereas, trust in the two other formal actors – doctors and mass media – correlated significantly with the four preventive behaviours for female respondents, and all but avoidance of meeting relatives and friends for male respondents. Among the informal actors, trust in social media and the four preventive behaviours are significantly correlated for both females and males. Trust in family and friends significantly correlated with frequent handwashing and avoiding meeting relatives and friends for both male and female respondents. Finally, trust in neighbours significantly correlated with all but the use of face masks for females, but with only the avoidance of meeting relatives and friends for male respondents. Generally, the strength of association for all variables is weak.

Table 9.2 Relationship between respondents' consideration of information actor and Covid-19 vaccination as trustworthy

Gender	Information actor trustworthiness	Vaccine trustworthiness
Female	Government	0.301** (0.000)
Female	Doctors	0.219** (0.000)
Female	Family and friends	0.146** (0.000)
Female	Neighbours	0.142** (0.000)
Female	Mass media	0.196** (0.000)
Female	Social media	0.076* (0.016)
Male	Government	0.212** (0.000)
Male	Doctors	0.156** (0.000)
Male	Family and friends	0.074* (0.020)
Male	Neighbours	0.106** (0.001)
Male	Mass media	0.162** (0.000)
Male	Social media	0.152** (0.000)

Note: Correlation coefficients (r) are presented with p-values in brackets significant at 0.05 with a single asterisk and at 0.01 with double asterisks.
Source: Authors' own.

Respondents' consideration of information actor and Covid-19 vaccination as trustworthy were correlated for all actors (Table 9.2). Notably, the findings are the same for male and female respondents.

10. Discussion

Our study examined the relationship that platforms and actors for Covid-19 information have with people's level of adherence to preventive measures. On information sources, the respondents mainly turned to formal platforms in search of Covid-19 information. As in other countries, Nigerians in Lagos preferred the mass media (radio, television, and newspapers) for Covid-19-related information sources. Respondents also trusted formal actors more than informal ones, but with social media considered more trustworthy than other informal information actors. High consideration reported for informational text and calls could indicate the heightened use of these sources by formal actors to disseminate Covid-19 information. In Nigeria, formal institutions such as WHO, Nigeria Centre for Disease Control (NCDC), and the National Primary Health Care Development Agency (NPHCDA) extensively used text messaging, informational calls, and social media to influence population behaviour regarding the pandemic.

In contrast to the very high level of adherence reported by Bolarinwa *et al*. (2020), we found that two behaviours – avoiding meeting relatives, friends, and neighbours and avoiding going to open marketplaces – attracted low compliance from both male and female respondents. These are expected outcomes as enforcement of social distancing is quite difficult in densely populated Lagos, unlike handwashing and use of face masks.

Contrary to the findings of Adesegun *et al.* (2020), we found that information platform preference is significantly associated only with washing hands and wearing face masks. In contrast, information actor trustworthiness correlated significantly with most Covid-19 preventive behaviours. Although platform preference is not significantly associated with vaccination trustworthiness, information actor trustworthiness correlates significantly with vaccine trustworthiness for both females and males. Studies have documented the conjunctural role of trust in government, trust in science and health-care workers, religion and religiosity, and political partisanship, among other factors in adherence to Covid-19 preventive measures (Ehde *et al.* 2021; Malik *et al*. 2020; Sherman *et al.* 2021; Wang *et al.* 2021). Actor trustworthiness may also contribute to future explanations, alongside contextual factors such as religion, and political affiliation, to explain vaccine hesitancy in different countries (Malik *et al*. 2020; Sherman *et al*. 2021; Wang *et al*. 2021).

Importantly, our findings challenge the causal claims in some literature about the role of information sources in adherence to Covid-19 preventive measures. Our results show that platforms and actors are linked differently with adherence to preventive measures. Therefore, decoupling information actors and platforms is important to understand their respective contributions to causal models. In doing

so, causal claims can be discretely attributed to variables that produce the outcomes. This is important since actor–platform interactions are likely to produce varied outcomes. For instance, formal actors on formal platforms and formal actors on informal platforms are likely to have different outcomes compared to informal actors on formal platforms and informal actors on informal platforms. These nuances are missing in the existing literature.

Another critical finding is that social media trust is significantly associated with Covid-19 preventive behaviours. As a platform, social media yields itself to both formal and informal actors. As a result, trusting social media does not automatically mean trusting the informal networks of actors in the context of Covid-19. The Covid-19 pandemic occasioned the adoption of social media by formal actors, especially those with technical knowledge of disease and the authority to make or influence policy decisions. The social media spaces were thus shared by both formal and informal actors, creating an environment where scientifically proven information and unfounded misinformation could thrive side by side. This study, like others (see, for instance, Dyregrov *et al*. 2020; Malik *et al*. 2020; Sathianathan *et al*. 2020; Shehata 2021; Tang and Zou 2021), establishes that actors with technical knowledge and policy authority were considered trustworthy sources of Covid-19 information. Arguably, actors retain their trustworthiness status, irrespective of the platform they choose to propagate their messages, formal or informal. Conversely, actors rated low in trustworthiness are not likely to become more trustworthy simply by adopting different platforms. This finding adds to growing evidence that trust is vital in transforming health-seeking behaviours, especially in contexts where sociocultural considerations weigh in these decisions.

Meanwhile, interesting gender gaps, although marginal, were observed in different aspects of the study. First, with information sources, female respondents reported higher cross-gender dependence on informal platforms and trust in informal actors. This is important as it has been established that those interpersonal connections influence adherence more than mediated contacts (Al-Hasan *et al*. 2020). Moreover, despite the generally low compliance with the directive to avoid going to open markets, women could not avoid it as much as men. This is likely because of the gendered nature of the burden of care for the family, which women disproportionately bear. All these point to the fact that policies that will work to contain the spread of Covid-19 need to be gender sensitive. Such policies need to address the peculiarities of the needs of men and women, the disability status of people, and religious and socioeconomic status.

11. Conclusion

Our findings support our initial assumption that non-disaggregation of information sources makes it difficult to account for the contribution of each information source component to adherence to Covid-19 preventive measures. Information platform preference is hardly related to adherence to preventive measures, whereas actor trustworthiness is related to almost all adherence measures. Therefore, it is necessary to disaggregate information sources to ascertain the contribution of its constituent parts to explaining relevant outcomes. It is also apparent that Nigeria's platform-focused approach to solving the country's problem of misinformation might not be as promising as those championing it might think. Regulating information platforms might not solve the problem of misinformation and disinformation, more so when people have alternative informal and largely unregulated platforms to use.

Given the study's narrow and non-causal approach, additional research is needed into how platform preference and actor trustworthiness discretely predict adherence to Covid-19 preventive measures. The outcome of such research has the potential to generate meaningful insights that could guide policy decisions on achieving high compliance levels. Our study has provided insights into the relationship that exists among these variables. Future studies can build on these. Equally deserving further attention is the motivation for platform preference and actor trustworthiness. When the basis is known, it can inform behaviour change in the choice of actors and platforms. This evidence can be generated using in-depth qualitative techniques that allow deep listening to elicit often unsurfaced perspectives. Finally, actor–platform interaction deserves further attention, considering its implications for information-giving and seeking behaviours. Future studies need to map the interactions of actors and platforms in the context of the Covid-19 pandemic. To precisely measure the contributions of information sources to adherence to Covid-19 preventive measures, there is a need to explore the nature of messages propagated by actors on different platforms. That can provide insights into why audiences prefer some platforms to others and trust some actors more.

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