# Behavioural Determinants of COVID-19 Vaccine Hesitancy: A Content Analysis of Nigerian YouTube Users' Comments

**Social & Digital Media Discourse**
**2023, Vol.4(1), 1-15**

**URL: http://sdmd.net.ng/**
**SDMD**

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**Abstract**
To achieve herd immunity against coronavirus, vaccination is necessary, however, the attitude of many Nigerians who refused to take the vaccine has hindered the 70% inoculation goal. This paper employs the theory of planned behaviour TPB to investigate the tone of comments on YouTube videos in Nigeria to identify the causes of COVID-19 vaccine hesitancy. March 2021 to December 2022 was chosen as the time frame and relevant dates for the content analysis. Findings indicated the comments were mostly neutral (62.6%), however, (32.4%) of the comments were negative and reported only (5%) positive comments. From the anti-vaccine themes analysed, results identified people don't trust the government on vaccines and general COVID-19 vaccine conspiracies mostly associated with religious expressions and biotechnology conspiracies as the major barriers causing hesitancy against coronavirus vaccine in Nigeria. The research presents suggestions for theory and advocates holistic collaboration with stakeholders as a practical implication.

**Keywords:** COVID-19 vaccine, YouTube video comments, Content Analysis, Health Communication

## Introduction

COVID-19 vaccination involves communicating to address safety and efficacy concerns by effectively providing information that builds willingness to get vaccinated (French, Deshpande, Evans, & Obregon 2020). Nevertheless, social, and behavioural barriers can hinder effective communication of COVID-19 vaccine-related behavioural change (Danabal, Magesh, Saravanan, & Gopichandran, 2021; Kanozia & Arya, 2021). Studies show that non-compliance with COVID-19 protocols caused growing infections and deaths (Chathukulam & Tharamangalam, 2021). Therefore, vaccination becomes necessary to curb the spread and achieve 'herd immunity' against the COVID-19 virus (World Health Organization, 2022). Herd immunity is achieved through vaccination, thereby reducing the likelihood of further transmission. However, misinformation has triggered vaccine hesitancy about the COVID-19 vaccines, therefore, challenging the effectiveness of behavioural change communication (Al Naam et al., 2022; Biswas, Alzubaidi, Shah, Abd-Alrazaq, & Shah 2021; Chou & Budenz, 2020; Jennings et al., 2021; Kanozia & Arya, 2021; Rameneni, Tooba, & Kumar 2022). Researchers found that relevant information and their sources shape human responses, influence people's actions and intentions, at the same time, become key to crisis management in public health (Van der Meer & Jin, 2020).

Studies show misinformation on new media platforms is a bane that has contributed immensely to COVID-19 vaccine hesitancy (Omer et al., 2021). The widespread misinformation about COVID-19 vaccines on social media platforms has contributed to a low vaccination rate of only 39.44%, despite a projected rate of 70% inoculation by the end of 2022 (Centers for Disease Control and Prevention, 2021; Olu-Abiodun, Abiodun, & Okafor, 2022; World Health Organization, 2023). Hence, examining how socio-behavioural factors influence Nigerian's willingness to take the COVID-19 vaccine is important and necessary. Specifically, this study

explores (1) the tone of comments in YouTube videos about the COVID-19 vaccine in Nigeria. (2) the study identifies factors causing the COVID-19 vaccine hesitancy from comments on Nigerian YouTube videos. While YouTube considerably contributed to conveying and receiving important health messages. However, limited attention is devoted to exploring the reasons and barriers that shape people's intentions that causes hesitancy towards coronavirus vaccines, as well as the implications their actions may have on social and behavioural research. Therefore, these research questions are raised: (1) What is the tone of comments Nigerians made regarding coronavirus vaccine in the YouTube videos? (2) Which are the causes for hesitancy regarding coronavirus vaccines identified in YouTube comments of Nigerians?

## Literature review

### *YouTube and Health Communication Campaigns*

It is estimated that YouTube has registered approximately (5.29 million) users in Nigeria, and the country hosts (33 million) active users on different social media platforms (Degenhard, 2021; O'Peters, 2021). YouTube is a popular medium designed to share and receive health messages about the coronavirus in Nigeria (Agbese, 2022; Dutta et al., 2020). As of November 26, 2023, Nigeria has recorded 267,173 reported COVID-19 cases as well as 3,155 deaths based on Word Health Organization reports (WHO). Nigeria's COVID-19 seroprevalence shows 78.9% occur due to low vaccination rates (Kolawole et al., 2022). Serology tests blood samples for COVID-19 antibodies. This helps us understand how the virus spreads and identify those who may have immunity. Serology is a crucial diagnostic tool in the fight against COVID-19 (Regalado, 2020).

YouTube provides easy access to online information and creates a platform for disseminating health messages about the coronavirus (Awais et al., 2022). During the coronavirus in Nigeria, micro-celebrities utilised YouTube video ads as a popular campaign communication channel (Agbese, 2022). Campaigns through YouTube can portray complex stories simplified, and described in an entertaining and educating manner, hence, making the stories easy to understand (Augusto et al., 2022; Briones et al., 2012). This is why public service campaigns use YouTube to distribute promotional videos and commercials (Ali & Yang, 2022). YouTube is the world's most recognised platform, popularly sharing videos with around 2.3 billion active users. The platform is estimated to host one significant hour of videos watched in roughly 100 countries and about 80 different languages, and 400 hours of videos uploaded every minute (Arthurs et al., 2018; Mohsin, 2022). YouTube is, therefore, undoubtedly one of the most recognised sources of knowledge and awareness for people's well-being (Ruppert et al., 2017). YouTube is a key source of health messages that predict the actions and intentions of new media users, and several individuals depend on YouTube to receive messages and information about coronavirus (Okpara et al., 2021). While YouTube plays a vital role as an important source of information, YouTube spreads COVID-19 vaccine misinformation (Li et al., 2022).

### COVID-19 vaccine hesitancy, Misinformation, and YouTube

In Nigeria, hesitancy against vaccines is a common practice. Vaccine hesitancy is a common behavioural practice where people raise concerns or question the safety of vaccines (MacDonald et al., 2015). As a major global public health problem, vaccine hesitancy affects the beliefs and behaviours of people to adopt vaccines (Adigwe, 2021). "Vaccine hesitancy is considered among the top 10 major global health threats" (WHO, 2019). Studies show Nigerians are opposed to the polio vaccine partly due to religious misinformation (Ezezika et al., 2022). Several factors including misinformation, distrust, complacency, and limited access to vaccines have been identified as contributing to vaccine hesitancy (WHO, 2015). Misinformation during pandemics is a practice that has existed since the Middle Ages (Zarocostas, 2020). However, misinformation spread through new media poses a significant risk to public health (Suarez-Lledo & Alvarez-Galvez, 2021).

Misinformation has been rampant amidst the COVID-19 pandemic, causing a significant lack of trust in information provided by healthcare providers and public authorities. (Montagni et al., 2021). Misinformation is unequivocally defined as the dissemination of false information, predominantly through social media and other information sources (Scheufele & Krause, 2019). The harmful public health practices and widespread

panic during the COVID-19 pandemic can be attributed to the rampant spread of misinformation (Tasnim et al., 2020). Misinformation on YouTube poses a significant threat and is a major cause of concern about the COVID-19 pandemic (Dutta et al., 2020). YouTube has become a platform for spreading COVID-19 vaccine conspiracy theories and rumours (Jennings et al., 2021; Ullah et al., 2021). According to Krishna (2017), the spread of misinformation about vaccines has reached epidemic proportions.

Krishnan and Thomson (2021) established that COVID-19 vaccines are the source of misinformation, which has been a subject of intense debate and controversy. Several studies, for example, (Suarez-Lledo & Alvarez-Galvez, 2021; Dutta et al., 2020; Li et al., 2022), have examined how the media shapes people's views of the vaccine crisis. Consequently, to combat vaccine hesitancy and dispel misinformation, scholars suggest implementing various strategies (Krishna & Thompson, 2021; Mheidly & Fares, 2020; Yemer et al., 2021). For example, health literacy is crucial for combating misinformation and promoting appropriate behaviours. It defines an individual's competence to acquire, process, and comprehend key public health messages and guides them to make informed choices (Sørensen et al., 2012). According to Krishna (2017), misinformation hinders people's ability to attain health literacy, as it equips them with incorrect knowledge, leading sometimes to wrong decision-making about their well-being. Misinformation regarding people's well-being is a prevalent challenge, especially on new media platforms. This has led to an increase in vaccine hesitancy among people (Krishna & Thompson, 2021; Mheidly & Fares, 2020; Suarez-Lledo & Alvarez-Galvez, 2021). Therefore, research shows misinformation is often used to determine the extent of vaccine acceptance and rejection (Zarocostas, 2020).

Misinformation about vaccines spread due to the Internet and social media like YouTube (Tang et al., 2021). Therefore, evaluating the accuracy of health-related messages shared online is a challenge for health communication research (Tang et al., 2021; Ullah et al., 2021). Sharing accurate information, particularly through YouTube, is crucial for effective health communication (Krishna & Thompson, 2021). Consistent scientific messages are valuable guidelines required in communicating about pandemics, given that the information is truthful and correct. False messages can promote risky behaviours and unsafe practices (Mheidly & Fares, 2020).

**Theory of Planned Behaviour**

The Theory of Planned Behaviour (TPB) proposes that three fundamental components predict future human actions (Ajzen, 1985, 1991). (1.) Attitude toward behaviour refers to how favourably or unfavourably a person views an action (Doll & Ajzen, 1992). (2.) A subjective norm is an individual's perception of the beliefs held by significant others regarding a behaviour (Ajzen, 1985, 1991). (3.) the ease or difficulty of carrying out behaviour is determined by the perceived behavioural control (Ajzen, 1985, 1991). These three dimensions are used as a framework for investigating the socio-behavioural forces that influence actions or people's intention to comment on YouTube about Nigeria's coronavirus vaccination. The basic assumption rooted in these concepts shows normative views are linked to societal pressure or an individual type of beliefs where people's actions are presented positively or negatively for the intended behaviour. Therefore, the basic assumption that controls people's action inherently involves their readiness or self-restraint in carrying out such behaviour (Ajzen, 1985). Behavioural beliefs, therefore, may affect how people's attitudes act positively or negatively in response to the intended behaviour in question (Ajzen, 2002). Research shows social institutions (e.g., socio-political and opinion leadership) and people's views about the COVID-19 vaccines based on (trust, attitudes, knowledge, awareness, and side effects) are crucial determinants of understanding vaccine intention (Adekunle & Mohammed, 2022; Jennings et al., 2021; Zimand-Sheiner et al., 2021).

Therefore, examining vaccine hesitancy through the lens of social and behavioural barriers is crucial given that local factors are connected to the given settings, vaccination history, and the people involved (Eskola et al., 2015; French et al., 2020). Behavioural change communicators identifying the drivers of vaccine hesitancy and suggesting effective vaccination campaign tactics is imperative (Danabal et al., 2021). Consequently, the theory of planned behaviour (TPB) is used as a theoretical

guide in this paper to understand hesitancy against the coronavirus vaccine from the comments people made from the perspective of Nigerian YouTube Users.

**Materials and Methods**

The study adopted mixed methods, hence, videos uploaded from March 2021 to December 2022 were chosen for analysis. The rationale for choosing March 2021 conforms to when Nigeria launched the COVID-19 vaccination campaign and was expected to reach the 70% target of fully inoculating Nigerians and eliminating coronavirus from Nigeria by December 2022. A search was conducted to generate videos for analysis on www.YouTube.com using these keywords: (COVID-19 in Nigeria, COVID-19 vaccination in Nigeria, as well as COVID-19 vaccine hesitancy in Nigeria). However, this search generated 319 YouTube videos. These videos were further sorted to choose only relevant videos. This approach follows previous studies (Briones et al., 2012; Covolo et al., 2017a). During the sorting process, the researcher noted that 65 of the YouTube videos failed the conditions set for inclusion since these videos were downloaded twice or predated the chosen time frame (March 2021). Consequently, these 65 YouTube videos were removed as well as excluded from being analysed, and a total of 254 videos were considered for analysis.

**Coding scheme**

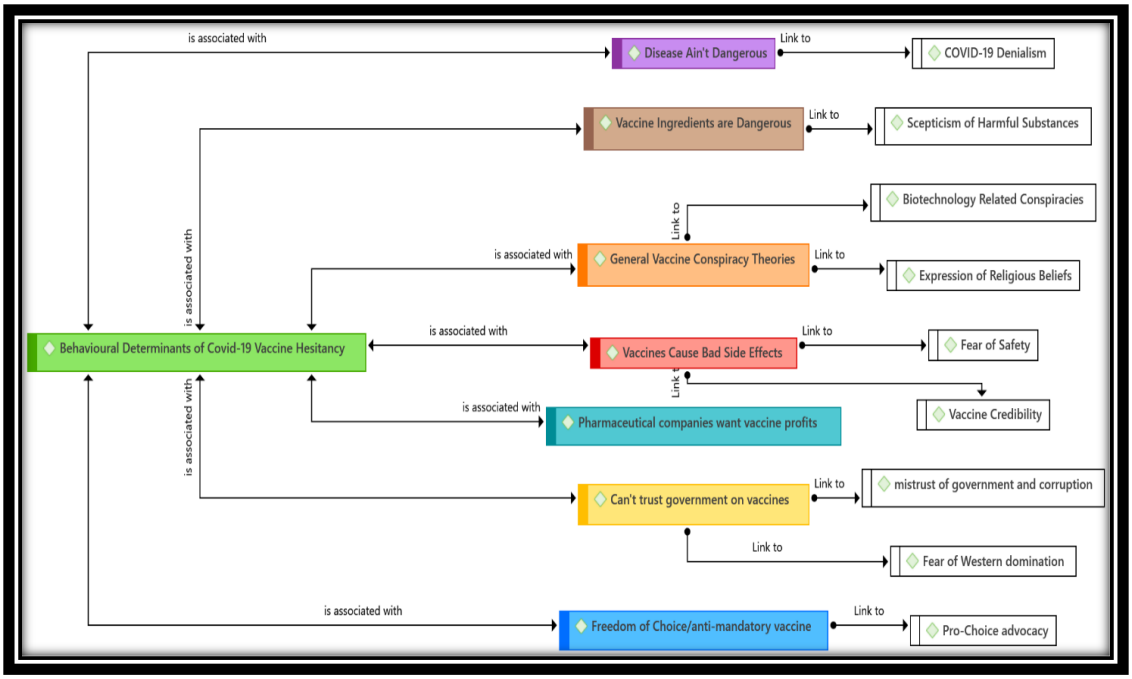
The first step was to download each video and save the link. Three main techniques were adopted as coding schemas for understanding the tone of YouTube comments: These techniques categorised the users' comments into (positive, negative, and neutral). Classifying the content of media as well as message coding as either (positive, negative, or neutral/not applicable) used to be a universal practice, especially, in content analysis (Briones et al., 2012; Covolo et al., 2017b; Nguyen et al., 2021). This study followed a similar practice and coded messages under a positive tone, which means messages that convey any information or news showing that coronavirus exists and support the imposed safety guidelines as well as accepted to be inoculated. Secondly, the tone is negative when categorised to define any message that opposes coronavirus exists and equally criticises the inoculation campaign. Third, messages were classified as neutral/not applicable when the tone for such information neither approves nor disapproves of the existence of COVID-19 or when the message is silent and focused only on messages that are not relevant or applicable to this research context.

**Coding**

A codebook was specifically designed by the researcher for thematically exploring the barriers causing hesitancy against coronavirus vaccines from comments of the sampled videos. It was observed that most of the comment sections were turned off in the YouTube videos, nonetheless, 57 videos' left their comments section accessible, hence, the researcher applied online method of data extraction using (exportcomments.com) to download and generate all the comments from the 57 YouTube videos sampled for analysis. Consequently, 985 user comments were downloaded as well as saved into a (Microsoft Excel) sheet for analysis. The researcher adopted and utilised the list of themes for comments related to vaccine hesitancy on new media which Broniatowski et al. (2018) developed: (1) freedom of choice/anti-mandatory vaccines, (2) can't trust the government on vaccines, (3) pharmaceutical companies wanting vaccine profits, (4) vaccines cause bad side effects, (5) general vaccine conspiracy theories, (6) vaccine ingredients are dangerous, and (7) diseases aren't so dangerous.

**Intercoder Agreement/Reliability**

In content analysis, the intercoder agreement or reliability refers to the stability and the tendency where all the allocated coders consistently code and re-code data in the same way. At the same, reproducibility is defined as the possibility whereby coders in any study cluster can organise themes and categories accordingly (Busch et al., 2005). Therefore, to ensure this study is reliable, two coders were selected to independently code the data. Macnamara (2005), stated that for maximum reliability to be realised, the content analysts should involve a minimum of two (2) coders required to code samples (called the reliability sub-sample) in content analysis. Consequently, in this study, the intercoder is reliably tested at (79.03%) for comments coded.




## Findings

The answer to research question one, which asked about the tone of comments on the coronavirus vaccine from the sampled YouTube videos, results show 985 comments had been generated from the 57 YouTube videos that have available comments using the online tool www.exportcomments.com. The researcher coded all the comments as (VCM1 to VCM 57). The findings indicated (32.4%) of the comments had a negative tone (*n* = 319). Also, the findings reported only (5.0%) comments had a positive tone (*n* = 49). However, (62.6%) of the comments analysed are neutral (*n* = 617). The findings of the research attributed this happened based on two (2) reasons. First, from these generated comments, it was observed that people discuss mostly (travel, politics etc) and there is not any mention of vaccine(s). Secondly, several comments from these videos used (anti-vaccine emojis), hence, there is no text included in the content.

The answer to research question two, which analysed and identified factors causing hesitancy against coronavirus vaccine from the comments of Nigerian YouTube videos. The researcher opted for thematic content analysis and adopted themes from Broniatowski et al. (2018) approach. The seven (7) main antivaccine themes namely: freedom of choice/anti-mandatory vaccines, can't trust the government on vaccines, pharmaceutical companies wanting vaccine profits, vaccines cause bad side effects, general vaccine conspiracy theories, vaccine ingredients are dangerous, and diseases aren't so dangerous in a majority (n=372 comments), and three (3) pro-vaccine themes: vaccines work, vaccines protect herd immunity, People who don't vaccinate put me/my kids at risk in (n= 49 comments only).

Interestingly, in this part of the analysis, however, eight (8) sub-themes have emerged: pro-choice advocacy, mistrust of governance and corruption in Nigeria, fear of Western domination, vaccine credibility and fear of safety, expressions of religious beliefs, biotechnology-related conspiracies, scepticism of harmful substances and COVID-19 denialism as the dominant sub-themes of hesitancy against coronavirus vaccine discussions in the sampled YouTube videos comments sections. The findings of this analysis present these seven (7) main antivaccine themes and eight (8) sub-themes as shown in Figure 1 below.

Figure 1: Themes and Sub-themes for Behavioural Determinants of COVID-19 vaccine hesitancy.

### Freedom of choice/anti-mandatory vaccines

The attempt by the federal government of Nigeria to make COVID-19 vaccination compulsory in 2021 was enormously rejected by the people in Nigeria. From the findings of this analysis, however, one sub-theme, pro-choice advocacy emerged in the Nigerian YouTube video with (n= 39) users' comments.

***Pro-choice advocacy***

According to pro-choice advocacy, people have rights and freedom of choice regarding their well-being, therefore, decision-making to take COVID-19 vaccination is entirely based on what the people consider necessary for themselves and their well-being. The pro-choice advocacy against the coronavirus vaccine is presented in these sampled comments analysed. For example: "Making it compulsory will only increase the suspicion index of citizens concerning the vaccine...wrong advice for real". VCM 17

> "My body, my choice! not going to be bullied, coerced, or threatened into taking something the Nigerian government or scientists don't have a clue about its contents. Not one Nigerian scientist can tell us what is contained in that vaccine it is telling people to inject into their veins" VCM 21
>
> "Stand for FREE CHOICE" CM 54, "People should be allowed to make decisions for their health. COVID-19 is a scam". VCM 16, "Free and informed medical consent". VCM 16, "My question is why force people to get vaccinated? If this is not an agenda" VCM 19
>
> "Prochoice, why do they have to try to sell this? If anyone wants it to get it to go ahead, I am not, over 80% of your immune system is in your gut. I never hear them talk about how to boost your immune system." VCM 38
>
> "We are NEVER going to get vaccinated, loads of the vaccinated are dropping off like flies. And nobody or group of people can keep us from our motherland." VCM 21

**Can't trust government on vaccines.**

Before the COVID-19 vaccination, most Nigerians did not trust the government at every level on several issues including immunization. The findings of this research discovered (n= 50) mistrust-related comments from Nigerian YouTube videos under two sub-themes in this category:

***Mistrust of governance and corruption in Nigeria***

Mistrust of governance in Nigeria is a social barrier mostly related to corruption in every sector of the public service. The findings of this analysis have established negative comments from the videos analysed. For instance, these comments exemplified how mistrust affects the COVID-19 vaccination campaigns:

> "Sell-out leaders as always. Know shame. Be wise and don't even accept this from them". VCM 24
>
> "Nigerian Government got no interest of saving lives which everyone knows" VCM 1
>
> "Lol this government is a joke, when other countries donated palliatives, the government did not ensure it get to the most vulnerable in the country...hmmmm" VCM 8
>
> "Can the Nigerian Government be trusted?" VCM 7
>
> "Those who received the stimulus money should be vaccinated. The manufacturers don't trust their vaccine and you have to sign indemnity. And you administer this to humans." VCM 14

***Fear of Western domination***

The notion of Western domination and economic subjugation is a barrier which affects the fight against coronavirus. Examples of the selected comments are given below:

> "Please don't believe the colonizers' vaccines they have a history of world terror around the world and especially in Africa due to slavery why would we take the poisons we have herbs for healing they drugs are for treatment not curing so please think don't take it !!!!" VCM 29
>
> "In open, you are telling us the solution is producing our own vaccine; when you were commanded by your masters, Bill Gates and western governments not to dare make such move. You are deceiving yourself not Nigerians. How can you produce your vaccine when you and presidency and all politicians have been

paid heavily to reject our unbeatable scientists. Very unfortunate! Nigerians wake up!" VCM 46

"African countries must be careful with all these free offers, why bring vaccines in that the lifespan has almost expired". VCM 12

**Pharmaceutical companies want vaccine profits**

Pharmaceutical companies are mostly accused of inventing the virus for profit reasons in six comments (n= 6) only. The following few comments are examples:

"The West will always give Africa crumbs from their own tables. It's why we need to boycott their products; Africa must start to develop so we can cut economic ties with them and deal with Asia on equal terms instead. They have nothing new to teach us. They do not want our progress or long life because they are only driven by profits….." VCM 46

"Viruses are a product of the Earth's ecological cycles. They regulate the planet's ecosystems and evolve life forms. The Earth also produces Humans, and our populations are also regulated by the planet in order to maintain our ecosystems. Vaccines are not naturally occurring they don't adapt and change like our body's immune system and some **people only care about getting rich.**" VCM 23

**Vaccines cause bad side effects**

Generally**,** vaccines cause side effects, just like any medication. While most side effects are minor and temporary, some can be more serious. From the analysis of this study, discussions on COVID-19 vaccination of Nigerian YouTube video users' comments established (n= 40) negative comments related to bad side effects of the COVID-19 vaccines in two sub-themes: vaccine source credibility and fear of safety.

***Vaccines credibility and Fear of safety***

From the data analysed in this category of sampled YouTube users' comments, COVID-19 vaccine source credibility was among the major barriers causing vaccine hesitancy. The analysis shows many YouTube users refuse to accept being vaccinated against the COVID-19 pandemic under the assumption that there are a series of reported cases:

"Your odds of dying are greater getting the vaccine than getting COVID" VCM 3

"Don't take it, hundreds of thousands of people in Europe are protesting against the forced vax campaigns and many people have negative side effects. MANY PEOPLE!" VCM 13

"Moderna oh my god. Run … run in the opposite direction". VCM 46

"The same AstraZeneca vaccine that's known to cause blood clotting…" VCM 14

Particularly, when a viral video of Yahaya Bello, the Governor of Kogi State-Nigeria, mentioned that the COVID-19 vaccine "is meant to kill" also contributed to YouTube users questioning the COVID-19 vaccine credibility and ignited and induced fears of safety in the Nigerian COVID-19 vaccination campaigns.

**General vaccine conspiracy theories**

The emergence of the COVID-19 pandemic in 2019 has witnessed another era of vaccine conspiracy theories globally. From the findings of this study, (n=146) general vaccine-related conspiracy theories have been established from the Nigerian YouTube video users' comments under two sub-themes: expressions of religious beliefs and biotechnology-related conspiracies.

***Expressions of religious beliefs***

The findings of Nigerian YouTube video user comments have demonstrated that many religious conspiracies suspect that the COVID-19 vaccine was a sign of the antichrist. The analysis is shown in these sampled comments:

"!! WAKE UP!! The new world order is here! illuminati = Real / Christ = Real! Mark of the beast! = Real! End-time prophecies = Real! Share & watch my exposing vids :) <3!!!!" VCM32

"My people die because of the lack of knowledge. Lucifer and his messengers of the new world order are on rampage, making sure the entire world becomes his prey! As for me and my household, we will not bow to the gods of Babylon, which is what this mass vaccination campaign is all about! This is the most sophisticated

crusade humanity has ever seen! It's so sad Christians can't see the hand of Satan in all this!" VCM 11. "Stop! They're taking pictures like it's a spectacle! Jesus is my vaccine. Please repent" VCM 20

***Biotechnology related conspiracies***

"Talk to your people in your African language. Say NO to infertility and depopulation vaccines from outside of Africa……What did the government do with the Madagascar herbal remedy? Your life is your life." VCM 7

"It's now I know you are a desperado, I can't imagine what some human being will do for the pleasures of this world?! wait till they switch on the 5G... you have just altered your DNA, I pity u". VCM 9

"Bill Gates can continue to experiment on people as a part of his depopulation, eugenics agenda, and get away with it is sick" VCM 33

**Vaccine ingredients are dangerous**

Vaccines contain a variety of ingredients, including adjuvants, preservatives, stabilizers, and inactivating agents, which are all safe and necessary for the vaccine to work. Nevertheless, the findings of this research have established (n=31) comments suspecting the coronavirus vaccine to contain harmful substances under this sub-theme:

***Scepticism of harmful substances***

"We are never going to get that poison, venom vaccine!!!, NEVER going to happen!!!...." VCM 22

"We will NEVER EVER until the end of the world take that poison, it will never happen, let it be clear!!!..." VCM 22

**Diseases aren't so dangerous**

Since its emergence in 2019, people do not believe in the existence of the COVID-19 pandemic, while others who believe, do not think it is so dangerous to their well-being. From the findings of this study, (n=6) Nigerian YouTube video users' comments think COVID-19 does not exist or it is not dangerous under the sub-theme COVID-19 denialism.

***COVID-19 Denialism***

The COVID-19 pandemic denialism was a common conception among Nigerian YouTube users' discussions in these sampled comments:

"Why taking vaccines for something that you are not suffering from?" VCM 7

"Hard to listen or take serious people who wear masks" VCM 18.

"Take off the mask Trust me it is not needed. Peace" VCM 26

"Funny that my friend living in Bamako Africa said nobody wears a mask and nobody has it…." CM 15 "Why take a shot when it goes away on its own wake up". VCM 9

**Discussion**

This study explores the influence of socio-behavioural factors as barriers that affect Nigeria's campaign against coronavirus vaccination. The study first examined YouTube videos about coronavirus vaccines in Nigeria as well as categorised their tone from the YouTube comments. Second, the study adopted a thematic content analysis approach and identified the possible factors making people to be hesitant to adopt the coronavirus vaccine as indicated from the sampled comments of YouTube videos analysed.

Results of the analysis of the YouTube users' comments discovered that (62.6%) of comments are neutral, while (32.4%) of comments are categorised as negative, however, only (5.0%) of the sampled comments conveyed a positive tone for the coronavirus vaccines. The results validate previous findings in Briones et al. (2012), which discovered that human papillomavirus (HPV) vaccine discussions on YouTube are mostly negative (51.7%). Therefore, Briones et al. (2012) recommend "future research could determine whether the source and tone of the video, as well as the specific content, are related to the negativity or positivity of the comments" (p. 485). Hence, findings from this research confirm that the tone of the sampled comments for the coronavirus vaccine YouTube videos was mainly negative. This study also adopted a thematic analysis approach to explore and identify the factors causing vaccine hesitancy from the YouTube users' comments. The findings show most messages which criticised COVID-19 vaccines from the ($n$ = 319) comments posted to

show how people (can't trust the government on vaccines, and the popular vaccine conspiracy theories) are dominant.

The findings of this research mainly provide a descriptive nature of how TPB (Theory of Planned Behaviour) could determine human actions. The findings suggest user comments were mostly triggered by (social movements and human rights advocacy groups) which voiced concerns to the Nigerian government against compulsory inoculation. In this regard, TPB (theory of planned behaviour) predicts that human actions are justified based on their 'attitudes, subjective norms, and perceived behavioural control' (Ajzen, 1985). Consequently, the subjective norms argue that influential people (e.g., opinion leaders, social institutions, or pressure groups) can shape the beliefs of people, especially, those who are subjected to their influence and who believe they 'should or should not engage' in the behaviour in question (Ajzen, 1985, 1991). Therefore, their attitude to engage in such behaviour is determined by the degree to which such individual(s) interprets the action to be favourable or unfavourable (Doll & Ajzen, 1992). In this regard, subjective norms have shaped YouTube user's intentions and stirred negative 'behavioural control' against getting vaccinated as unfavourable to their "freedom of choice". Similarly, the findings also presented the fear of vaccine safety and efficacy-related concerns. This revealed people are largely 'misinformed' about the COVID vaccines. according to Krishna (2017), misinformation can create a barrier to people's understanding and affect their ability to achieve 'health literacy' because those equipped with wrong information are tantamount to making improper health decisions. Therefore, the 'theory of planned behaviour', Ajzen (2002a) predicts that behavioural beliefs are influential on how people can either show a positive or negative attitude about the behaviour. Consequently, Breslin et al. (2021) observed that some people may only agree to get vaccinated against COVID-19, if and only if there are not any reported side effects. This correlates with Limbu, Gautam, and Zhou (2022), who discovered perceived behavioural control as the driving force for vaccination intentions.

The analysis also established the presence of 'general conspiracy-related theories' have dominated comments about the COVID-19 vaccines. The results further proved and empirically supported that misinformation is a threat to vaccination campaigns on social media platforms, particularly, campaigns against coronavirus vaccines. Montagni et al. (2021) reveals that since the commencement of the coronavirus, 'fake news' spreads faster and made people sceptical and suspect the veracity of health messages that emanated for public authorities and healthcare service agencies. Abayomi and Quadri (2022), posit that lack of honesty and accountability against public authorities' response to COVID-19 pandemic has intensified the prevailing and worsening public trust. The analysis also discovered conspiracies related to 'expressions of religious beliefs and biotechnology' as dominant in YouTube users' deliberations about the COVID-19 vaccines. For example, some of the comments stated when you "Take the vaccine, you die or lose your fertility", whereas other comments believed "It's mRNA Technology..." used for the vaccine is dangerous to their health. Remarkably, the findings also showed how some comments stated, "Jesus is my vaccine" or the vaccine is a "Mark of the beast". The comments signalled how misinformation based on religion and conspiracy theories were influential and triggered for example, vaccine hesitancy in Makurdi, Nigeria, where research discovered the persistent vaccine hesitancy resulted due to aphorisms about 'Jewish expectations of the anti-Christ, such as the mark of the beast, being chained to hell, acting immorally, and having animalistic inclinations' (Uroko & Okwuosa, 2022).

**Theoretical and Practical implications**

In this study, the theory of planned behaviour (TPB) predicts the actions of Nigerians from the YouTube user's comments analysed. However, TPB has failed to sufficiently link the psychosocial barriers, specifically lack of trust as the basic underlying belief that shapes people's attitudes to be hesitant against the COVID-19 vaccines in Nigeria. From the findings, it is fully understood that when misinformation is shared persistently during pandemics, it has a greater consequence that perhaps could result to distrust, especially, from messages originating mostly from health agencies and specialists. Lovari (2020), posit that spreading misinformation, particularly, about pandemics such as the coronavirus, when not managed and carefully

handled, can increase risk behaviours among people that could be harmful to society. Therefore, COVID-19 vaccine hesitancy is imminent among people due to misinformation that leads to distrust in public health messages from the Nigerian government. Moreover, the persistent misinformation led to a distrust of public health institutions, hence, the overall ideas of health safety measures and messages have largely been disregarded by the people. Therefore, TPB could not completely explain the causes of vaccine hesitancy from the Nigerian perspective and the motivating factors that influence misinformation and distrust as well as why and how government messages are perceived negatively.

Secondly, the analysis also discovered the influential role of content creators as pro-vaccine supporters who influenced COVID-19 vaccine messages from their comments and sensitised people to embrace vaccines. This study, therefore, recommends governments at all levels in Nigeria, should implement 'collaborative strategies' using competent people who create content to promote practical risk communication, through a 'top-down and bottom-up' method of communicating particularly, with primary healthcare service providers, traditional media, opinion leaders (community/traditional chiefs and religious leaders or organisations, as well as pressure groups) to ensure that people are educated and sufficiently enlightened to embrace the benefits of vaccines. however, due to insufficient public health amenities in some parts of Nigeria, it is advised that a door-to-door awareness campaign about the importance of the coronavirus vaccine should be encouraged.

**Suggestions for future research**

Based on the findings of this research, three important conclusions were proposed. First, given how misinformation triggered distrust, mostly in public health messages about the COVID-19 vaccine from the Nigerian government. Consequently, further research is needed to consider exploring the causes of disinformation and its possible consequences on public trust, especially in pandemic communication in Nigeria. Secondly, this research is limited to the YouTube user's comments, hence, further studies should examine the influence of disinformation and public trust for communicating vaccines extended across other social media platforms including (Facebook, WhatsApp, and Twitter) as records show Nigeria has approximately 33 million social media penetration. Thirdly, the socio-behavioural factors will possibly continue creating challenges for Nigeria's determination to completely end the menace of coronavirus. Therefore, as a proactive way to improve the national vaccination plans, it is recommended that increasing the percentage of vaccine acceptance is paramount for making public health-related policies. Consequently, the Nigerian government should develop desired collaborative initiatives, where all the key stakeholders are involved to promote educative campaign strategies and bridge existing gaps, especially, distrust of government messages to clarify misinformation as well as address the COVID-19 vaccine safety messages and concerns for efficacy.

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**How to cite this article:**

Mohammed, S. (2023). Behavioural Determinants of COVID-19 Vaccine Hesitancy: A Content Analysis of Nigerian YouTube Users' Comments. Social & Digital Media Discourse, 4 (1), 1-15.