



RESEARCH ARTICLE

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YOUTUBE VIDEOS AND DECISION MAKING ABOUT THE COVID-19 VACCINE IN BRAZIL

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ABSTRACT

In 2020, the outbreak of COVID-19 was declared a public health emergency. In 2021, after the development of vaccines, a next challenge arises, being the immunization of as many individuals as possible. Although the search for vaccine production was carried out in a short period, and the advantages of vaccination programs are known worldwide, there is a reluctance to vaccine. Social media are effects of actions that replicate, disseminate and publish information and arguments about vaccination are no different, and thousands of information and positions on immunizers were discussed. The present study seeks to elucidate the impact of information on vaccination against COVID-19 made available on YouTube. Was analyzed 100 videos in different profiles. Our data show the influence that social media can have on population-wide acceptance of vaccines and this fact must be urgently addressed by Public Health Service agencies. At the time of this study, videos uploaded by healthcare professionals accounted for just over half of the viewed videos that reached millions of people. Is require different approaches to solve this problem. Improving the extent to which social media reaches the public with understandable, up-to-date and scientifically accurate information should be part of a national strategy.

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INTRODUCTION

It is known that major pandemics affected society with various etiological agents. Currently, the COVID-19 virus manifests itself in patients ranging from asymptomatic infections to severe respiratory disorders, being first detected in Wuhan, China, in late 2019 (Oliveira et al., 2021). However, on January 30, 2020, the World Health Organization (WHO) declared the outbreak of the new Corona virus (SARS-CoV-2) as a global public health emergency, due to the rapid spread of COVID-19 in all countries. the continents of the world. In view of this, the WHO recommendations included the accelerated development of vaccines, biosecurity measures, social isolation, and physical prevention measures (Domingues, 2021). In this context, the development and improvement of vaccines had started, about 200 vaccine development projects were registered with the WHO, of which about six were in phase three, during which clinical trials must be carried out in different countries, this phase three characterizes the

phase prior to the final phase, in which after it comes the approval (Cueto, 2020). Therefore, this development of vaccines for the acceleration of vaccination occurred thanks to investments from governmental and non-governmental institutions, with vaccines being developed with the commonly known platforms, such as inactivated virus, attenuated virus, protein subunits, recombinant vaccines and viral vectors, new technologies of nucleic acids (DNA and mRNA). In 2021, after the development of vaccines from multiple technologies with proven safety and efficacy, a next challenge arises, being the immunization of as many individuals as possible (Rocha et al, 2021). Currently, there are several vaccines against the COVID-19 virus available in Brazil and worldwide. In Brazil, such vaccines need the approval of the regulatory agency, Anvisa, and the World Health Organization (WHO) that define the regulation and evaluate the data promoted from studies and clinical trials, to seek efficacy and safety for the population. In Brazil, the approved vaccines are Comirnaty (Pfizer/ Wyeth), Coronavac (Butantã), Janssen Vaccine (Janssen-Cilag), Oxford/Covishield (Fiocruz and AstraZeneca). According to

data published on 09/17/2021 by the Butantã Institute, the vaccine most used by the Brazilian population was Coronavac, which uses the inactivated virus, with approximately 94.850 million doses applied (Jennings *et al.*, 2021). Although the search for vaccine production was carried out in a short period of time, and the advantages of vaccination programs are known and commented worldwide, there is a reluctance to vaccine adherence among individuals, since the number of individuals who denying immunization has grown in recent years. The reasons associated with hesitation are diverse and vary according to location, gender, religion, age, and especially, the actions and information disseminated on social media (Oliveira *et al.*, 2021). This immunity provides, in addition to the individual protection of the vaccinated person, the elimination of the circulation of the infectious agent in the environment and the indirect protection of susceptible people. vaccination. Social media are effects of the actions of individuals who replicate, disseminate, and publish information on certain subjects and thousands of information about vaccination and positions on immunizers were discussed (Monari *et al.*, 2021) Within public health, vaccines are a constant target of misinformation and affect public perception (Teixeira & Santos, 2020). Disinformation is “false information created to harm a person, social group, organization or country” and false information or misinformation is “simply information that is false or incorrect and “fake news” is a type of false information where the information relates to a news event, and the malicious intent is present on behalf of the person creating the news, but not necessarily on behalf of the person who spreads the news (Greifeneder, *et al.*, 2020). YouTube is one of the most prevalent social media platforms with billions of daily views and is the second most used search engine after Google. Since 2005, when it was launched. YouTube has more than 2 billion users 10 and because it is an easily accessible platform and offers several genres of content, in addition to being available in 80 different languages, it can reach different ages. Disinformation about vaccines is already one of the causes of the low rate of immunization against diseases, especially in underdeveloped countries (Google. Press, 2022). In the digital age, more people are relying on the internet and social media as sources of health-related information and care (Smailhodzic *et al.*, 2016) As with social media platforms in general, health-related content shared on YouTube is often not empirically substantiated and still easily accessible. Therefore, in view of all the above, the present study seeks to carry out the mapping and elucidate the impact of information related to the vaccine that is made available on the online YouTube platform of free access.

METHODOLOGY

A YouTube search was performed on January 13, 2022, using the keywords “COVID-19 vaccine” in a web browser with a clean cache. On this platform, the term “COVID-19 vaccine” was searched and the first 100 videos corresponding to the search were evaluated and that met the inclusion and exclusion criteria. Inclusion criteria were videos whose titles contained the words “vaccine” and “covid-19”, in Portuguese and with audio. Videos that were not directly related to the topic were excluded. The retrieved results were evaluated by an independent researcher and then validated by a second researcher. The descriptive characteristics of the video, including title, hyperlink, number of views, number of likes and un-likes, were collected. After being categorized, the data were submitted to descriptive statistics using the Excel program, indicating the absolute and relative occurrence of categorical information. For comparison between two groups, the test was used “*t of student*” or “Mann Whitney” according to the nature of the data and the significance level used was 5%. Following the guidelines of the National Research Ethics Commission (CONEP), ethical approval and informed consent were not required for this research, since the data are in the public domain.

RESULTS

Of the 100 videos shown, 97 videos were included and three excluded because they were in duplicate. The total views at the time of data

collection was 22,643,182 views. Of these, 76.28% were videos in favor of vaccination, 3.1% against and 20.6% neutral (Table 1). The propagation rate can be evaluated by the sum of the likes, views, comments, shares rates, divided by the total results found meaning how many interactions resulted for each post. The highest rate of propagation was from videos against vaccination (313,626) followed by videos in favor and neutral (Table 1).

Table 1. Absolute and relative frequency of COVID-19 vaccine information and metrics

	Total	In favor	Against	Neutral
N	97 (100%)	74 (76,3%)	3 (3,1%)	20 (20,6%)
Views	22.643.182	18.943.494	893.074	2.806.614
Likes	912.598	813.658	43.901	55.039
Comments	107.180	85.552	3.903	17.725
Propagation rate	243.948,5	268.144,7	313.626,0	143.968,9

Table 2. Absolute and relative frequency of COVID-19 vaccine information and metrics about COVID-19 Vaccines in videos with and without responsible information

	With responsible information	Without responsible information	P Value
VIEWS	274074	177928	0,1148
LIKES	7870	12832	0,3228
COMMENTS	1232	931,4	0,0334 *

*Differents Value from each Other

When we separated the sample by videos that presented information about the training of the person responsible for the information, 56 of them (57.7%) presented some type of information, being 27 graduates and 29 postgraduates and 41 (42.3%) videos did not present information. Table 2 presents the comparison between the averages of views, likes and comments between these two groups and we observed that there was only a statistically significant difference between the number of comments.

DISCUSSION

The influence of the media on the health of Brazilians has proven positive, according to some scientific studies, the information found on these platforms can encourage individuals with chronic diseases to seek and maintain treatment (Neto, & Flynn, 2019). Nowadays it is increasingly common for people to share their life stories dealing with all types of illness through videos and influenced by these reports, many sick individuals go to doctors and health professionals to seek help and carry out treatment. In addition to influencing adherence to treatments, the internet allows people with certain diseases to get to know each other and exchange information, experiences and even feelings regarding the difficulties provided. According to research, these online communities, aimed at exchanging knowledge and support, are considerably positive as they allow the patient not to feel alone facing such a problem and to want to seek medical help as well (Neto, & Flynn, 2019). The main public health challenge now is vaccine uptake and concomitant herd immunity. Something new, like acceptance of a new vaccine, follows predictable patterns of adoption just like in other areas ranging from agriculture to technology. Some population segments are prone to adopting an innovation immediately and successive population segments adopting at slower rates over time until the last segment, which are more resistant and may never adopt the innovation A substantial proportion of the world's population is reportedly hesitant to receive the innovation vaccine for COVID-19 (McKee & Bohannon, 2016). The current challenge is different from the past, not only because of the speed with which new information about COVID-19 and the effectiveness and availability of vaccination is being generated, but also because of the speed with which information is disseminated to the entire population through the social media (Donovan, 2021). In Brazil, a study carried out in 2021 obtained 7124876 views¹⁵ and in the present study, the number of views was 22,643,182. Although the number of views was much

higher, probably due to the greater search for information about the vaccine, it was much lower than that reported by a study carried out in the United States, which obtained 169,446,382 views (Basch *et al* 2021). Videos containing news in favor of vaccination correspond to approximately 76% and only 3% were against the vaccine. The spread rate means the reach of the news. In the present work, the highest rate of spread occurred in videos against vaccination. The propagation rate is the sum of the rates of likes, views, comments, shares, divided by the total results found, this means that on average each post resulted in 313,626.0 interactions. This result is in line with research published in 2018, carried out by scientists at the Massachusetts Institute of Technology (MIT), which points out that fake news is spread 70 times faster than true news (Vosoughi *et al*, 2018). The time required to disprove a Fake News is around 12 hours and this contributes to its dissemination. (Zubiaga *et al*, 2016) The rate of propagation of information contrary to the theme proved to be more comprehensive, even with a smaller number of videos, on the other hand, the number of videos in favor of vaccination were predominant, but the rate of propagation was reduced. The absence of scientific information, reliable sources, or available references, reduces the public's ability to understand whether the information and positions match reality, or if it only corresponds to the personal opinion of the person in charge without scientific basis, thus helping to spread wrong information. and influencing the prevention scenario, such as vaccination. More than half of the videos analyzed had some type of information about the training of those responsible. When comparing the two groups we can observe that only in relation to the number of comments these data were statistically significant. We can highlight the influence of the identity of the person who posted the video.

Most of them declared themselves to be professionals with a higher level and this may have generated a feeling of confidence and amplified the intention to comment. Studies that evaluated interactivity in YouTube posts about health show that one of the factors that determine the popularity of a video is the presence of a professional in the field in the video (Yurdaisik *et al*, 2020). The historic alignment of the healthcare system with public production facilities has made Brazil well equipped to engage in the transfer of technology for COVID-19 vaccines, but obstacles and limited coordination between production/procurement, regulation and distribution have affected Brazil's vaccination strategy against COVID-19. To complicate matters further, the conflicting relationships between governors and president influenced what could have been a successful, coordinated strategy. Political disputes have sown doubts and mistrust in unnecessary COVID-19 vaccines. Such suspicions could have far-reaching public health consequences that will be difficult to reverse (DA FONSECA *et al*, 2021). This study is delimited in several ways. Only 100 videos were included, the attributes of the videos were only examined in relation to the number of views, and we cannot distinguish between the number of views and the number of viewers. We didn't have data on viewer characteristics such as geography or demographics, nor did we know the extent to which these videos affected behavior. Finally, we rely on the keywords "coronavirus vaccine" to search and classify the videos; thus, we rely on YouTube search algorithms. The main result of this study, the number of views, was based on YouTube numbers and ranking algorithms. Despite these limitations and although the sample size was small, the videos examined were widely viewed. This is important not only to reach the general population with accurate vaccine information, but also to be aware of and respond to the misinformation and misinformation that can be disseminated through widely viewed content on social media and influence the hesitation of people who do not have it. sure to get a vaccine. Our data show the influence that social media can have on population-wide acceptance of vaccines, which must be urgently addressed by Public Health Service agencies. At the time of this study, videos uploaded by healthcare professionals accounted for just over half of the widely viewed YouTube videos that reached millions of people. Different approaches are needed to understand and address the concerns that subgroups of people have about COVID-19 vaccination. Improving the extent to which social media reaches the public with

understandable, up-to-date, and scientifically accurate information should be part of a comprehensive national strategy to help people make informed decisions about vaccination.

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