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Analysis of information related to chloroquine and ivermectin in the digital media Youtube and Instagram: relation between Covid-19 and infodemic

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Abstract

Objective: To analyze drug information on Brazilian social media regarding Covid-19 treatment. **Methods:** This was a cross-sectional qualitative-quantitative descriptive study. We analyzed publications related to chloroquine and ivermectin, indicated as possible adjuvants in the treatment of Covid-19, on Instagram and Youtube social media. We selected the first 100 publications from the terms "chloroquine and "ivermectin" and hashtags "#chloroquine" and "#ivermectin". The analyses were divided into characteristics and engagement of the publications, content analysis, and information type classification. Descriptive analysis was used to represent absolute and relative values and the dispersion of the sample from the parameter of maximum and minimum values of each publication. **Results:** It was shown that Instagram presented the highest number of total publications referring to chloroquine and that media contained (n=6) publications made by health professionals. On the other hand, Youtube showed the highest number of followers in profiles published about the drugs and Covid-19 and obtained n=21 publications made by verified profiles. 53.8% of the publications about chloroquine were related to Covid-19 treatment in Instagram and 74.4% referring to ivermectin related to early treatment. On Youtube, 70.3% of the information about ivermectin addressed efficacy in pharmacological treatment. About the type of information, for ivermectin in both media, there was a prevalence of malinformation. For chloroquine on Instagram, 53.9% were classified as disinformation, and on Youtube, 73.4% contained the correct information. **Conclusion:** The regulation and control of health information in social media and the amplification and reorganization of pharmaceutical assistance activities and management of health services are necessary to ensure health promotion and rational drug use.

Keywords: health information management; chloroquine; ivermectin; social media; Covid-19.

Análise da informação sobre cloroquina e ivermectina nas mídias digitais Youtube e Instagram: relação entre Covid-19 e infodemia

Resumo

Objetivo: Analisar as informações sobre medicamentos nas mídias sociais brasileiras referente ao tratamento da Covid-19. **Métodos:** Trata-se de um estudo descritivo transversal quali-quantitativo no qual analisou-se publicações sobre cloroquina e ivermectina, apontados como possíveis adjuvantes no tratamento da Covid-19, nas mídias sociais Instagram e Youtube. Foram selecionadas as 100 primeiras publicações a partir dos termos "cloroquina e "ivermectina" e hashtags "#cloroquina" e "#ivermectina", de cada rede social. As análises foram divididas em características e engajamentos das publicações, análise de conteúdo e classificação do tipo de informação. Foi utilizada análise descritiva para representar valores absolutos e relativos, bem como a dispersão da amostra a partir do parâmetro de valores máximos e mínimos de cada publicação. **Resultados:** Demonstrou-se que o Instagram apresentou maior número de publicações totais referentes a cloroquina e que a mídia conteve (n=6) publicações realizadas por profissionais de saúde. O Youtube apresentou maior número de seguidores em perfil que publicou sobre os medicamentos e Covid-19 e obteve 21 publicações feitas por perfis verificados. No Instagram 53,8 % das publicações sobre cloroquina estavam relacionadas ao tratamento da Covid-19, bem como 74,4 % referentes a ivermectina relacionados ao tratamento precoce. No Youtube, 70,3 % das informações sobre ivermectina abordam sobre eficácia no tratamento farmacológico. Sobre o tipo da informação, para a ivermectina em ambas as mídias houve prevalência de má informação, enquanto para a cloroquina no Instagram 53,9 % foram classificadas como desinformação e no Youtube 73,4 % continham informações corretas. **Conclusão:** A regulação e controle das informações em saúde nas mídias sociais, bem como a amplificação e reorganização das atividades de assistência farmacêutica e gestão de serviços em saúde se fazem necessários para garantia da promoção em saúde e uso racional de medicamento.

Palavras chaves: gestão de informação em saúde; cloroquina; ivermectina; mídias sociais; Covid-19.

Introduction

Originated from the new coronavirus (SARS-COV2), COVID-19 was declared a pandemic by the World Health Organization (WHO) on March 11th, 2020.[1] It was established from the viral spread that originated in the city of Wuhan, China, in 2019, constituting a disease with potential contagion spread.[2] Measures of social isolation, use of masks, and distancing were imposed as sanitary actions to prevent the spread of the virus. There was no pharmacological treatment or vaccines that acted in a way to lead to such reduction.[3]

Search for treatment and a possible cure has become the key to fighting against coronavirus.[4] Thus, drugs such as chloroquine, hydroxychloroquine, ivermectin, nitazoxanide, azithromycin, and dexamethasone,[5,6] for example, had baseline and preliminary studies against SARS-COV, became protagonists in the race referring to the treatment of the disease. These drugs are becoming a political-social weapon and a premise for the abuse and irrational use of drugs.[7,8]

But such drugs still do not present efficacy against SARS-COV2 since no study was described as relevant and complete for this assertion, which the WHO corroborated.[6] Even a year after the start of the pandemic, incomplete, contradictory, and false information about the treatment of COVID-19 is still published on Brazilian social networks. This is mainly due to contradictory and disorderly information published by the health ministry and the federal government.[9]

Digital social networks such as YouTube, Instagram, Facebook, and Twitter are characterized as technological means for sharing ideas and spreading information.[10,11] They do not have any effective legal regulation regarding the type of information circulating in the network and have reached the potential that can be evidenced by the metrics provided by each media, such as sharing and views.[12] In this way, a single message can have a global reach a significantly impact society.

Consequently, the information related to COVID-19 in digital social media had repercussions in the country, as the population needed answers and measures against the disease.[7] The infodemic[13,14] that was installed and still persists, characterized by mass production on specific themes that occur during the epidemic, which may or may not be accurate, impacted the propagation of correct information about possibilities of treatment, care measures and management of the disease.

Thus, specific information disorder can be evidenced, defined by the construction and dissemination of harmful and false information. Given the above, with the classification proposed by Wardle (2019)[15] as a starting point, the information can be classified as: disinformation; misinformation and malinformation.

Thus, the present study analyzed, one year after the beginning of the pandemic in Brazil, the information posted on digital social media about the indication for the use of chloroquine and ivermectin in the treatment of COVID-19. Concerning confront and direct efforts of pharmaceutical assistance, management and security of the information service to ensure the best care and management against Covid-19.

Methods

It is a qualitative-quantitative, cross-sectional and descriptive study. In which drugs posts were identified and analyzed as possible adjuvants in the treatment of COVID-19 in digital social media. For this study, chloroquine and ivermectin were chosen for convenience after reading the information about them. The posts were collected from Instagram and YouTube on March 14th, 2021, one year after the first COVID-19 case recorded in Brazil. The authors conveniently chose such media based on the possibility of obtaining data through the metrics and circulation of the information offered by each platform.

The #chloroquine and #ivermectin hashtags were used in the "most recent" section for selection in the Instagram media and for YouTube the terms "chloroquine" and "ivermectin" were used in the "submission date" and "last hour" section.The first 100 posts of each media were selected, and inclusion criteria were applied such as posts in Portuguese and related to COVID-19. The group of authors in charge performed analysis of the posts through consensus among the assessments. The volume of data collected for this study took into account the assessment ability of the authors' team.

For Instagram and YouTube, the engagements[16,17] were analyzed in the posts, based on the metrics provided by each media, to establish a parameter for their reach. The following was verified: submission date of the post, number of views and comments of each post, number of followers of the profile that made the post, if it was a verified profile (account authenticity criteria) and if it included self-declaration a health professional and its affiliation. In Instagram, the number of posts with hashtags was counted. For YouTube, the number of likes of each post was also verified.

For content analysis, it was verified if the posts mentioned treatment and/or early treatment against COVID-19 and whether they associated the posts with other drugs involved in treatment possibilities for the disease. For the analysis of the type of information, the classification determined by Wardle (2019)[15] was used, in which he specified information disorder as follows: disinformation, created to cause specific harms to society; misinformation, produced but not intended to cause damage, and malinformation, where truthful information has been manipulated to cause harms. To support the contents analyses and classification defined by Wardle (2019),[15] we considered the COVID-19 treatment bulletins provided by the World Health Organization, such as The WHO Therapeutics and COVID-19: living guideline

Descriptive analysis was used to represent absolute and relative values and sample dispersion from the parameter of maximum and minimum values for each post.

Results

The analysis carried out on the Instagram digital social network evidenced a number almost three times higher for the total posts related to chloroquine when compared to ivermectin (Table 1). However, the number of views is higher for ivermectin. Regarding the number of followers, the same profile obtained the index for the highest number of followers for both drugs, a verified personal profile of a public person connected to politics.

For the YouTube digital social network the expressive number of views is valid for ivermectin, in a proportion nearly three times higher when compared to chloroquine (Table 1). It is noted

that the same post obtained the highest number of views and comments when concerning chloroquine. The maximum numbers of followers for the drugs were nearly 2 million for ivermectin and 3 million for chloroquine.

Table 1. Characteristics analysis of the Brazilian posts related to chloroquine and ivermectin selected in Instagram and YouTube one year after the outbreak of the COVID-19 pandemic.

Characteristics of the Posts	Drugs			
	Chloroquine		Ivermectin	
	maximum	minimum	maximum	minimum
Instagram[1]				
Total of posts with the hashtags	52,305	-	18,127	-
Views	8,885	-	9,045	-
Comments	154	-	155	-
Number of Followers	51,700	18	51,700	97
Verified Profiles	1	-	1	-
Health Professional	1	-	5	-
YouTube[2]				
Views	40,313	1	118,408	5
Comments	1,026	-	3,389	-
Likes	9,300	-	7,500	-
Number of Followers	3,120,000	2	2,040,000	-
Verified Profiles	16	-	5	-
Health Professional	1	-	-	-

1. After the inclusion and exclusion criteria, total of posts were evaluated in Instagram: n=13 for chloroquine and n=43 for ivermectin; 2. After the inclusion and exclusion criteria, total posts were evaluated in YouTube: n=45 for chloroquine and n=64 for ivermectin.

Regarding the evaluation of the posts' content (Table 2), it can be seen that, in Instagram, 53.8% of those dealing with chloroquine asserted that the drug was helpful for the treatment of COVID-19. In comparison, the expression "early treatment" was prevalent for ivermectin (74.4%), and drug association was present in 23% of the posts related to chloroquine. In YouTube, the result was different; 70.3% assert that ivermectin was helpful for COVID-19 treatment. The association of the use of the drug with others related was similar, with the majority (24.4%) related to chloroquine.

The type of information disorder was also analyzed. For chloroquine in the Instagram posts, the most frequent type of information was classified as disinformation (53.9%). In contrast, correct information about this drug was the majority in the YouTube analyses. For ivermectin, malinformation was prevalent in: Instagram (34.9%) and YouTube (43.8%).

The post with the highest numbers of views and comments in the Instagram social media analyzed was the same for both drugs. These posts referred to the benefit of early treatment with chloroquine, ivermectin, and other drugs such as hydroxychloroquine. The post involved the participation of a health professional during a live radio program, with ideological and political support. Consequently, it was classified as disinformation.

The content analyzed for YouTube and its classification according to the information extracted, the same post had the highest numbers of views and comments about chloroquine. It was an unverified, personal profile that mentioned the ineffectiveness of early treatment. Consequently, the information was classified as correct. While the post that obtained the highest number of views about ivermectin on YouTube belonged to an unverified profile, a person who asserted that ivermectin could be used to treat COVID-19. This post involved the participation of health professionals and was classified as disinformation. Regarding the post with the highest number of comments, it was about ivermectin on YouTube. It belonged to a verified journalistic profile that indicated ivermectin for the treatment of COVID-19. It was classified as disinformation.

Discussion

With the pandemic induced by the new coronavirus, the massification of diverse information related to possible treatments against the disease was noticed. Such information supported by the current infodemic had the pretext of reaching the most significant number of people, regardless of its veracity or not.[18] It can be even more inflamed by the lack of coordination of the Brazilian government, causing social insecurity and instability.[19] Thus, it is clear that, after one year of the pandemic in Brazil, information characterized as disinformation, misinformation and malinformation continues to circulate through the Internet, mainly in the digital social media, reaching and impacting the population.

A study proposed by Falcão and Souza (2021)[9] addressed fake news in the context of Covid-19 in Brazil. They demonstrated that in addition to the whole premise of disinformation and infodemic, Covid19 brought "disinfodemic" to the country's reality. "Disinfodemic" is sustained by infodemia, as not only the volume of information is present and outstanding, but also the amount of false information circulating is prevalent. Thus, the disinfodemic can be deliberate or not, further contextualizing the information disorder and, in the case of drugs without scientific evidence, it can have consequences for the population's health.

Table 2. Assessment of the content and type of information disorder of the Brazilian posts selected in Instagram and YouTube one year after the outbreak of the COVID-19 pandemic.

Content and Analysis of the information included in the posts	Instagram[1]		YouTube[2]	
	Chloroquine (%)	**Ivermectin** (%)	**Chloroquine** (%)	**Ivermectin** (%)
Content				
1. Does the post claim that it is helpful for the treatment of COVID-19?	53.8	9.3	17.7	70.3
2. Does the post claim that it is helpful for the early treatment of COVID-19?	30.8	74.4	2.2	10.9
3. Does it establish any association/relation with other medications?	23.0	7.0	24.4	-
Type of information disorder				
Disinformation	53.9	27.9	17.8	34.4
Misinformation	-	18.6	4.4	1.5
Malinformation	15.4	34.9	4.4	43.8
Correct information	30.7	18.6	73.4	20.3

1. After the inclusion and exclusion criteria, total of posts were evaluated in Instagram: n=13 for chloroquine and n=43 for ivermectin; 2. After the inclusion and exclusion criteria, total posts were evaluated in YouTube: n=45 for chloroquine and n=64 for ivermectin.

However, the mass-circulation of information permeates the digital social media, such as YouTube and Instagram themselves, which are sources of information and studies on health, although with non-standard and often low quality. Ramos *et al*. (2020)[20] showed the information quality of YouTube videos about chloroquine and hydroxychloroquine at the beginning of the COVID-19 pandemic in Brazil. They revealed that more than 50% of the posts about these drugs presented misleading and low-quality information.

It is noteworthy that the prerogative about chloroquine, supported and encouraged by the federal government, is still active in the digital social networks. Since its passage in Ordinance 344 of 1998, which required medical prescription for its sale, as well as its inclusion in the "COVID kit" distributed by the Ministry of Health without any corroborated scientific value, it has become the target for a supposed treatment of COVID-19.[21] Based on the published clinical trials, the WHO emphasizes that there is no evidence demonstrate the efficacy of this drug against COVID-19.[6]

In the context of the low quality of information that can add to the spread of misleading information, the study by Santana and Simeão (2021)[22] showed that Instagram was responsible for 10.5% of the spread of false information about COVID-19 in the country, only behind WhatsApp (73.7%). Such fact corroborates this study, which pointed out that, for ivermectin, Instagram presented less than 20% of correct information. Thus, it is understood that social media are information drivers. Through their metrics and engagement, it is possible to analyze the quality and type of information conveyed.[17]

While the content analysis further revealed the search for information about medications for the treatment of COVID-19. The study by Niknam *et al* (2021)[23] on the analysis of the Instagram content about COVID-19 revealed that the post mostly contained information about the following: drug treatment, distribution of medications, news about vaccines, symptoms, and characteristics of the virus. With this, it is perceived that Instagram also has a system for dissemination and sharing, evidenced by its metrics, information that allows for fast reach, verifying the subject matter being shared, and the reactions to it by the readers.[12] Thus, it can provide instruments for content analysis and observation of the engagements with the posts, showing how society behaves in the face of the spread of both false and correct information, which often cannot be distinguished.[24,25]

In this way, it is shown that regardless of digital social media, it is clear that there is a lack of control over the published content. Even though YouTube has an educational nature[26] and has been evaluated in this study with a more significant number of correct information. The lack of control and legislation on the dissemination of information and the quality they offer further encourages the current infodemic and impacts the country's public health.

The disinformation system and the prevalence of fake news, as well-defined and classified by Wardle (2019),[15] favors the irrational use of drugs and, consequently, the increase in the overload implied in the Unified Health System. For example, the sale of ivermectin increased R$ 44 million in 2019 to R$ 409 million in 2020, with a peak of 829%, as revealed by Melo *et al*. (2021).[21] They study the self-medication and indiscriminate use of drugs during the COVID-19 pandemic.

Self-medication is encouraged by the lack of consensus among health professionals about the COVID-19 treatment and the circulation of false information through digital social media.[7] Consequently, generating harm to the patient who uses the inappropriate drug can lead to adverse reactions, increased morbidity, and even death. A study produced by the Federal University of São Paulo (*Universidade Federal de São Paulo*, UNIFESP)[27] revealed patients with COVID-19 who used the "COVID kit" chloroquine and azithromycin, could present a higher risk of developing acute kidney injury.

Thus, it is understood that guidance and the provision of correct information and control of its propagation on social media, associated with a more remarkable ability of pharmaceutical care to assist and manage this fact, are vital points to ensure rational use of medications. Lula-Barros and Damascena (2021),[28] when studying pharmaceutical assistance in the pandemic caused by COVID-19, showed that it must reorganize itself and spare no effort to promote guaranteed access to health technologies, Telepharmacy, promotion of rational use of drug, and safety in dispensing.

In future research studies, in addition to the information available on digital social media, the relationships between individual legislators and pharmaceutical companies should be unraveled. Just as the industry's involvement with influential organizations and individuals is fundamental to protecting the integrity of the policy, strategy and operational decision-making in the face of health and pharmaceutical care-related courses of action.[29] However, a legal instrument cannot be waived to regulate advertising and its means of disseminating information relative to the use of medications for advertising purposes. Currently, there is a resolution by the National Health Surveillance Agency (*Agência Nacional de Vigilância Sanitária*, ANVISA) – RDC No. 96/2008 – which cannot be applied by a court injunction. There is an explicit mention in this resolution that the information about drugs must be scientifically proven and should not encourage and/or induce indiscriminate use of drugs.[30] However, this resolution does not contemplate commercial information conveyed on the Internet and social media, which reinforces the need for legislative control instruments in these media.

It is understood that health care, together with the ability to manage health services, has an urgent need to promote strategies for disseminating information grounded on and corroborated by the scientific literature, taking advantage of the comprehensiveness and guarantee of the health interventions.

Conclusion

As evidenced by this study, the infodemic associated with information disorder was the pillar for digital social media to become driving forces and gain prominence during the COVID-19 pandemic in the country. It should be noted that there is no regulation and legislation in force to guarantee and demand improvements in the quality and content that circulate on social networks. Thus, it is clear that they must encourage the practice and control the circulation of misleading information to recognize correct content. Added to this, public policies must be encouraged to promote education in health and digital education. The irrational use sustained by disinformation can further impact on the Unified Health System, diverting and reducing possible resources that could be destined for the management and handling of COVID-19.

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Collaborators

TPB and TAN delineated the study design. TPB and TAN collected, analyzed and interpreted the data. TPB, TAN, ACJ and SCE wrote and reviewed the article. The authors assume responsibility for the data published and guarantee the accuracy and integrity of the article.

Conflict of interest statement

The authors declare no conflict of interest regarding this article.

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