Articles

Creators' voices and creature's numbers: the communication of arboviruses on Facebook of the Brazilian Ministry of Health

Vozes dos criadores e números da criatura: a comunicação das arboviroses no Facebook do Ministério da Saúde do Brasil (resumo: p. 20)

Voces de los creadores y números de la criatura: la comunicación de las arbovirosis en el Facebook del Ministerio de Salud de Brasil (resumen: p. 20)

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This study analyses the content production about arboviruses on the fan page of the Brazilian Ministry of Health before, during and after the Zika virus epidemic. It uses a mixed methods study that comprises the content analysis released from 2015 to 2017 and the Collective Subject Discourse of the workers who produced the contents. The results show that 649 out of 5,732 posts collected addressed arboviruses, with a greater focus on prevention and Zika. The Brazilian National Health System (SUS) was found in a small part of the sample. There is a concern to inform about health with quality, but differences in the specialist's language and timing between what is published online and what is conveyed to technical health services cause communication noise. It is a transmissional discourse, with no dialogue with the population, underestimating the potential of social media for interaction, sharing and engagement.

Keywords: Virtual social media. Health communication. Health in mass communication. Arboviruses. Prevention.

Introduction

Virtual social media are strategic for the communication of public health institutions. They are dialogue and conversation tools, and such potential should be explored, rather than just having one-way communication. Various studies have already evaluated health content posted on virtual social media. In general, they are studies describing how health issues are presented in these virtual spaces by public agencies. Notwithstanding, their authors do not incorporate the content creators' perceptions to understand health communication strategies in these spaces. Thackeray, Smith and Van Wagenen[1] have already presented the advantages of social media adoption in public health: it can be used to inform, educate, and empower people about health issues; to enhance the speed of information in case of emergencies; to mobilize community partnerships; to facilitate behavior changes; and to enable the understanding of public perceptions. And for this purpose, there must be professional qualification for content producers and a clear direction of health communication actions on social media

Nevertheless, Sentra-Toset and Farré-Coma's[2] systematic review shows that, although public health institutions use virtual social media for health promotion, the contents are unidirectional and not very interactive, besides being managed by unqualified people. The US Centers for Disease Control and Prevention has published and disseminated The Health Communicator's Social Media Toolkit[3]; however, it is of great importance that each country understands the singularities of its people to communicate health through social media.

Infodemiology or information epidemiology is a term coined by Eysenbach[4] to define the science of the distribution and determinants of certain information in an electronic medium, specifically the internet, or in a population, to inform public health and public policies, and how infodemiology data can be collected and analyzed in real time. One of the possibilities is to identify, quantify and monitor relevant public health-related posts on the internet, as well as measure the effectiveness and reach of health campaigns, detecting and quantifying disparities in health information available online. Among the various social media used, Facebook is the most mentioned tool in the studies addressed in this review[2], above all in the United States. It was founded in 2004, and Brazil is currently home to over 102 million Facebook users. The Facebook of the Brazilian Ministry of Health has over four million followers. Its mission is to qualify the Brazilian National Health System (SUS) through dialogue with the Brazilian population. Bearing in mind that Brazil has a history of health emergencies related to arboviruses transmitted by Aedes Aegypti mosquitoes, such as Zika, Dengue, Chikungunya, and Yellow Fever, it is crucial to understand the federal administrator's position regarding the communication of this information on the main virtual social media.

Therefore, this mixed methods research is guided by three questions: 1. How does the Brazilian Ministry of Health communicate on arboviruses on its Facebook?; 2. What content about arboviruses is available on its Facebook fan page?; and 3. How does the content production process and the content creators' perception determine what is presented to the population of the country?

This is an explanatory, descriptive, mixed method research, which seeks not only to obtain quantitative findings from the fan page, but also to understand them from the content creators' perspective[5].

The purpose is to describe health communication on social media, particularly how the topic arboviruses was presented on the Ministry of Health fan page. The explanatory, sequential, mixed methods project involved gathering quantitative and qualitative data, followed by comparing the findings and better understanding of quantitative data using the collected qualitative data.

The sample consisted of posts published on the official fan page of the Ministry of Health - www.facebook.com/minsaude - in three consecutive years (2015-2017). It covered the phases before, during and after the Zika virus epidemic in Brazil. Schiavo[6] claims that health communication has the role of influencing individuals and the community to adopt healthy habits. Hence, it must be verified how the Ministry of Health uses Facebook for this purpose.

Development

The mixed methods research included collecting, analyzing and mixing quantitative and qualitative data to enhance understanding the research problems on a global and integral scale, rather than in isolation. Data were collected directly from the official fan page of the Brazilian Ministry of Health in the quantitative phase. Following Bardin's[7] proposal, data were organized into categories for content analysis with the objective to describe: the frequency of diseases; the presence of images; the reference to the SUS; the focus of the post[8]; the posting period; the reactions to the post; and the positive, negative or neutral positioning of the main comment about the post. These categories were organized in line with the research objectives to identify possible trends and lacks in arbovirus issues in the social media of the Brazilian Federal Public Health Administrator. For this purpose, an application was first created to automatically extract all published posts, which were then manually classified as being or not related to arboviruses. As a next step, it was applied the Netvizz software, which partially retrieved the contents published on the Facebook fan page. Notwithstanding, it was observed that none of the two automatic data extraction tools presented complete results, with all published posts, but mostly composed of videos.

This finding would point towards a limitation relating to the reliability of the study first designed, since it was not possible to establish a pattern of what type of posts and subjects Facebook allowed to extract automatically. On the one hand, it is common knowledge that automatic extraction is more effective and avoids transcription errors when working with manual data collection. On the other hand, as it is a retrospective extraction, the software does not extract the total content posted by the fan page. Some authors have suggested collecting data in real time, or as close to reality as possible, which was not the case[9]. Data collection on the fan page was completely and manually redone for this research. This occurred from the observation, followed by a Facebook announcement: 1. The company Cambridge Analitica was using data from over 87 million users for political purposes; and

2. The Data Law of the European Union, which restricted the way of managing user data, imposed access limits for collecting content on its platform through automatic applications. Data were collected individually for this study, by three different researchers: the main researcher and two scientific initiation fellows, who received training for this purpose.

Thence, the posts that addressed Dengue, Zika, Chikungunya, and Yellow Fever were included in the sample, with a day-by-day view of each post (covering from the first, dated January 2015, to the last post, from December 2017). Because of the need for comprehensive data collection, no post that met the inclusion criteria was overlooked in the analysis[7]. It was created an Excel database with all study variables for statistical analysis. After checking the data consistency and file cleanup, the data were sent to the RStudio software, in which statistics were performed through the frequency of variables.

The second phase of the study, which was qualitative, was carried out with a follow-up of the quantitative findings to support their explanation, exploring the production process and the perceptions of its creators.

It seemed relevant to include as research subjects the communicators responsible for the published content, so that attitudes, representations, specificities, and similarities could emerge. In this phase, some interviews were conducted on the content production process for social media, after the submission and approval of a supplement with the interview questions for the project approved by the Research Ethics Committee of the University. Entitled "ArboControl Integrated Project: Information Management, Education and Communication for the control of Dengue, Zika and Chikungunya Arboviruses," it was registered under the Certificate of Presentation of Ethical Appreciation (CAAE), nº 75119617.2.0000.0030.

An interview script was drafted from the quantitative results, addressing issues about work routines, health communication and arboviruses. The interviews were audio recorded and transcribed for the organization of the Collective Subject Discourse (CSD)[10], placing the speeches in their context to be understood and interpreted[11]. This tabulating and organizing qualitative data technique is founded on the Social Representations Theory (SRT), which synthesizes knowledge, socially developed and shared on a reality common to a particular social group[12].

According to the CSD, the thinking of various people on a particular topic does not function as a weight or height variable, but it is possible to produce a sum of the discourses on a given subject. Key expressions are extracted from individual answers. They are the most significant parts of the text, its essence. Their synthesis composes the main ideas that briefly describe the meaning of the speeches in a frame of speeches, in the first person singular, on a particular subject, turning into a speech in line with all the content collected. Thus, a puzzle is built with parts of individual discourses, excluding what is not common to all and building a single discourse.

In the same way Spink and Spink[13] show that the press is part of everyday life, bringing clues for reflection on how particular concepts, values and topics are naturalized, it is understood that a social media discourse has the same potential. Pre-tests of quantitative and qualitative data collection instruments were applied. Frame 1 presents the different research stages.

Frame 1. Methodological synthesis of the mixed study on arboviruses on the fan page @ minsaude, 2015-2017

Mixed Methods Research		
Research Design	Quantitative Method	Qualitative Method
Objective	To describe health communication on social media, specifically how the arboviruses topic was presented on the Ministry of Health fan page.	
Research Participants/Research Universe	5,732 contents 649 posts about arboviruses (11.3% of the total) 292 posts about Dengue 418 posts about Zika 198 posts about Chikungunya 73 posts about Yellow Fever	Four Journalists
Data Collected	Worksheet for registering content from the Ministry of Health fan page @minsaude	Individual face-to-face and remote interviews
Data Analysis	Content analysis and word cloud	Collective Subject Discourse and Social Representations

Source: the author (2020).

For the present study, eight professionals who worked in the social media of the Ministry of Health in the period were contacted, and four of them agreed to participate. The meetings with the research subjects were held in Brasília - DF, either by Skype or face-to-face, and the audio of the responses was recorded and later transcribed.

In relation to the interviewees' profile, they are women hired by an outsourced company, aged between 20 and 37 years in the study period, with a higher education degree in different careers in the area of Human Sciences, but without specific health education. Two of them have education background to work on social media. Moreover, none of the respondents had decided to work in the health area, but they took advantage of the job offer. The team consisted of two to five people, who did not always work exclusively with social media, but also with journalistic production for *Blog Saúde* (Health Blog), to which the links on the fan page were directed. Frame 2 presents the main ideas and the CSD organized from the interviews.

Frame 2. The Collective Subject Discourse (CSD) on arboviruses on the Ministry of Health fan page

Main Idea	The Collective Subject Discourse
1 Microcephaly as a determinant of focus on Zika.	The focus was on Zika because of microcephaly, the crisis it was causing, the severity [of the disease]. Previously, the main content of arboviruses was Dengue. The communication was seasonal, following the epidemiology of the diseases. We reinforced more about arboviruses in the summer, in the rainy season.
2 Prevention approach.	The Ministry of Health focuses on prevention, rather than on treatment after the disease is already in place. Thus, it makes us also follow this path on social media. Preventing the individual from getting ill is more important than treating him/her, despite the fact that Brazilians do not usually take care of their health, going to the hospital only when they are dying. Talking about treatment on social media raises controversy, because not every place will have a certain medication available. There are health professionals and Secretariats that have a different view from that of the technical area of the Ministry of Health, and as the SUS is decentralized, a [Brazilian] state treats an issue in a certain way and a municipality in another, and this yields numerous online bottlenecks.
3 Content with women and children have greater engagement.	Posts about pregnant women and children are extremely attractive. At that point, the relationship between Zika and microcephaly was confirmed, and everyone knows pregnant women and tag them in the comments to alert.
4 Interaction in the comments with technical-scientific basis.	The doubts that arouse about arboviruses were always the same. We always tried to answer them with the measures taken by the Ministry of Health, with data from a standard FAQ, or with content from the blog and booklets of the Ministry of Health, or even with the technical area itself. For direct complaints, such as "I was in line, but received no assistance," we advised the person to use the SUS Hotline and the Health Department. There was no automatic response. When there were exacerbated complaints or cursing, they were hidden.
5 Conflicts between the specialist's language and the social media.	The technical area wanted us to use technical terms; however, Facebook is for everyone. If I insert information on how to put sand in the little dish under the potted plant, it will have more impact than a scientific research. No matter how much we try to simplify it, it is not something accessible. Then, there was not much interest [from users].
6 Cards as an information transmission strategy.	We use many cards with little written information to draw [the user's] attention to health, clearly identifying the subject addressed, with a link to the blog. However, people do not read things correctly. If you write: "If you were vaccinated less than ten years ago, you don't need to take it again," the user will answer something like: "I was vaccinated seven years ago. Do I need to take it?" People don't want general information. They need very specific assistance to talk about their case.
7 A partnership with the technical area ensured the work quality.	The technical area was very cooperative, giving suggestions and approving the material. We didn't ask for approval just for the most basic tasks. We acted based on agenda meetings, release or briefing.
8 Different timing between official communication for social media and for services.	The complaint: "A health professional says something here, and you are saying something else." The technical note to which we had access - from a meeting with the technical area, or from the Cabinet, in a decision agreed with the Minister - does not reach at the same time at the other end of the SUS, and that leads to divergence. It indicates a flow over which we have no control. If the technical area decides with Fiocruz (for unknown reasons) to give a single dose vaccine, we comply with the rules and make a new communication. The government and researcher have no credibility in Brazil. It takes a long time for the health professional to receive updated information from the Ministry of Health, besides not knowing what is being conducted in terms of research. Therefore, there are management and communication gaps that hinder the service, and so users end up not having a good return when they seek the health service.
9 Inform, educate and guide the population in a qualitative way, in addition to bringing people closer to issues that influence their lives.	The fan page is a bridge, a safe source to educate, inform, clear up doubts and clarify, in accessible language, quality content and information based on the technical area, on specialists. We even dealt with basic things, and for many people this was not the role of the Ministry of Health. However, it was there, because that was related to people's daily lives. It is not the role of social media to report on government announcements and where the Minister went or not, but to address issues involving people's health.

Source: the author (2019).

The universe of posts collected covered 5,732 contents, of which, in relation to arboviruses, 649 posts were collected (11.3% of the total), with 292 addressing Dengue; 418, Zika; 198, Chikungunya; and 73, Yellow Fever. It is highlighted that some of the posts focused on more than one of these diseases.

Their focus (408 posts) in the researched period was predominantly related to prevention, with guides, advice and warnings on how people should behave in their daily lives. It was observed in similar amounts, with 113, 106 and 96 posts respectively: updates related to arboviruses (such as new cases, bulletins and news released); communication of actions by the government, communities and health professionals; and content on epidemiological control activities and diagnosis of symptoms. It stands out that some of those posts dealt with more than one topic. It is noteworthy in the sample that the specific content on the treatment of arbovirus symptoms had a limited participation, with only 26 posts. Table 1 shows the relationship between the published posts according to the topic and disease presented.

Table 1. Frequency of posts by topic and disease on the facebook.com/misaude fan page, 2015-2017

Issue	Dengue	Yellow Fever	Zika	Chikungunya
Updates	35	6	88	19
Intervention	60	3	86	32
Research-Diagnosis	31	6	74	21
Prevention	218	59	229	153
Treatment	8	1	22	4

Source: the author (2019).

The Collective Subject Discourses (CSD) 1 and 2 confirm prevention as the main strategy and with the highest number of posts. This is justified, among other factors, by the singularities that reports on treatment, for example, would render impossible to present case by case on a social media, according to the individual health situation.

The research team expected greater dedication to the Zika disease, because of its uncertainties and negative impact on the lives of pregnant women, babies and their families. It is emphasized here that the content with the greatest repercussion in the period (see Figure 1), with more than 57,000 shares until data collection, gives information to pregnant women about Zika prevention. The interviewees mentioned that the card combines the urgency of the topic with its consequences for two audiences with high engagement on the page: women and babies, according to the CSD 3. Published on December 1, 2015, it presents confirmation of the relationship between the Zika virus and microcephaly in Northeast Brazil, in addition to invoking the mobilization of families with prevention guidelines for pregnant women.
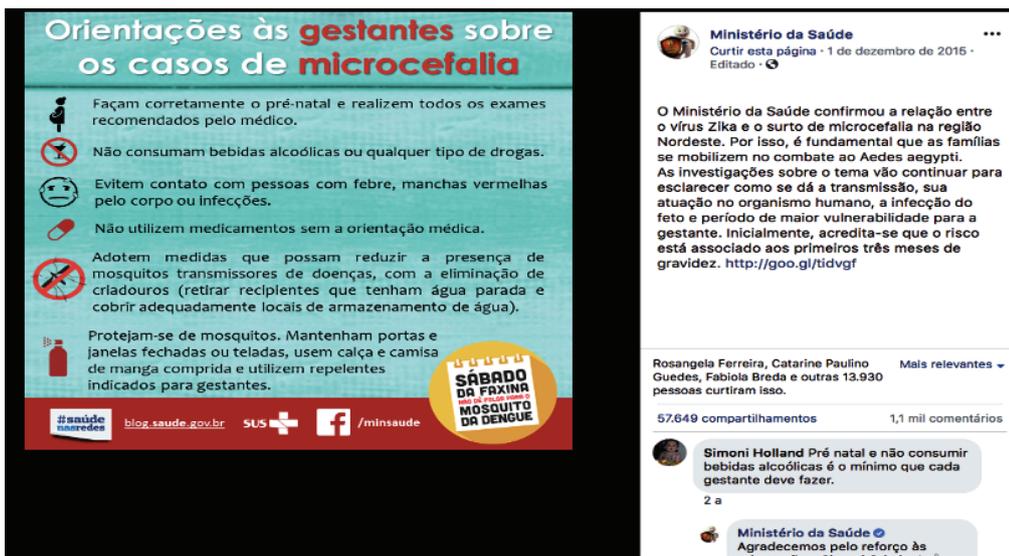
Figure 1. Post with the highest engagement on the @minsaude fan page, 2015-2017
Source: Facebook of the Ministry of Health (2018).

Graph 1 draws a relation between diseases and engagement of the main comment. No disparity was observed, and the main comment, in more than 50% of the posts, was in a neutral tone for all diseases. When excluded comments classified as neutral, the negative ones related to Yellow Fever and Zika, and the positive ones concerning Chikungunya and Dengue, stand out.
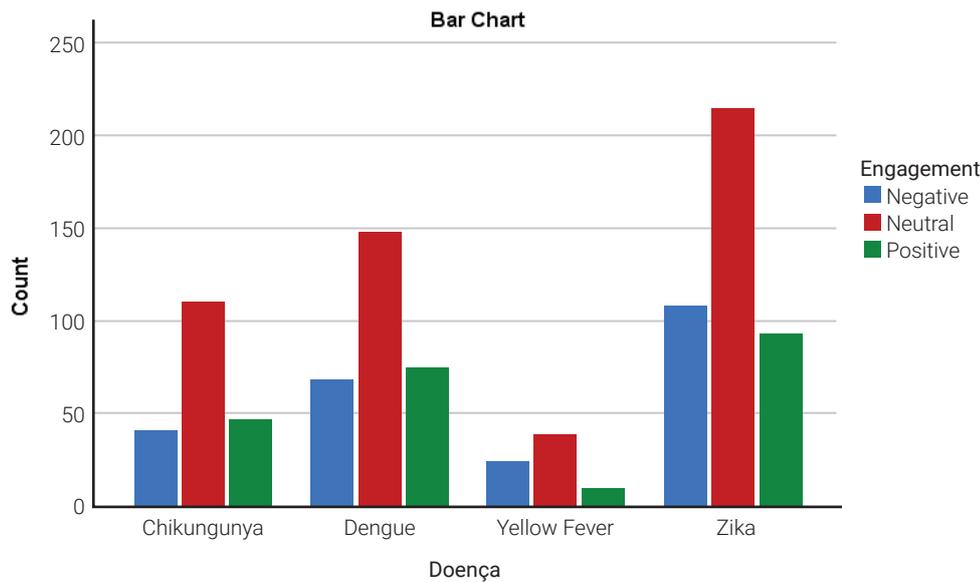
Graph 1. Engagement of the main comment according to arbovirus on the @minsaude fan page (2015-2017)
Source: the author (2019).

It can be noted that, when the topic 'variable' is inserted, the engagement relationship is kept. For all topics, almost half of the most engaged comments are neutral, apart from the topic 'intervention', which accounts for almost 40% of negative comments. Neutral comments were those that have no qualifiers or value judgments about the post, or comments that present bookmarks and tags from friends. When neutral comments are excluded, there is a predominance of negative comments on most topics, except for research and diagnosis. This indicates that the population apparently has a more favorable view when it comes to scientific information, as shown in Table 2.

Table 2. Relationship among the topic of the posts, diseases and engagement in 2015-2017.

Topic	Engagement	Dengue	Yellow Fever	Zika	Chikungunya	%
Updates	Negative	15	1	25	8	28.32
	Neutral	16	3	44	11	49.56
	Positive	4	2	19	0	22.12
Intervention	Negative	27	0	38	15	39.62
	Neutral	20	3	32	11	41.51
	Positive	13	0	16	6	18.87
Research - Diagnosis	Negative	8	2	17	6	21.88
	Neutral	14	3	41	10	54.17
	Positive	9	1	16	5	23.96
Prevention	Negative	46	22	62	29	25.25
	Neutral	113	30	115	85	52.45
	Positive	59	7	52	39	22.3
Treatment	Negative	4	0	5	2	23.08
	Neutral	1	1	14	2	61.54
	Positive	3	0	3	0	15.38

Source: the author (2019).

For the respondents, people's engagement is associated with frequent questions, answered from standardized or specific technical-scientific information, according to each case, as described in the CSD 4.

It should also be underlined that, for social media workers, the use of cards is a relevant strategy to bring the population closer to health information, even if it is a challenge to harmonize the expectation for the transfer of technical information to simplify the language as much as possible, as detailed in the CSDs 4, 5 and 6.

It cannot be disregarded low health literacy, defined in the Healthy People 2010 report[6] as peoples' ability to read, understand and act on health information to make decisions about their quality of life. The use of accessible language, with a brief text, objective and attention-grabbing information, in card format, can help people understand and know what should be done in each health situation.

With reference to the target audience of the post, most of them (468 posts) aim the common citizen, who would have responsibilities to be fulfilled and performed, in contrast to 69 posts, which present the role of health workers. Another 172 posts identify the administrator as responsible in situations involving the disease. They are posts that present epidemiological data released by the government; guidelines both for state and municipal management and for services and information about what should be done (or what has already been done) by management at the federal, state or municipal level, and which is not up to people or workers. There is a greater prominence for individuals in the posts, whether holding them accountable for the action or showing them what should be done. It must be noted that there were contents calling the health workers' attention in their role as health surveillance agents. In health communication, the audiences need to feel invested and well represented, and to feel that the contents were prepared for them[6].

According to the CSD 7, the respondents also reported the partnership with the Health Surveillance Department technicians as part of the integrated workflow, which is deemed essential, given that not only professionals in the communication area are responsible for health communication. Araújo and Cardoso[14] even present a parallel with the integrality of SUS, which must notice the multiple dimensions of communication and the different knowledge in health that underpin any strategy. Concurrently, the analysis of the Yellow Fever vaccine case (for which Facebook @minsaude produced a card, on April 4, 2017, informing about the two doses of the vaccine, and another card, on April 7, 2017, indicating the change to a single dose of the vaccine - Figure 2) shows the possibility of observing numerous comments distrusting the strategy used. Such feeling comes not only from the population, but also from SUS professionals. This indicates the difference in response time between official communication for social media and that for SUS workers, according to the CSD 8. The federal administrator's information and definitions do not reach the end of the services with the same speed as they are posted on social media, since the latter has instantaneity as its characteristic. Thus, as online content is published without previously informing health workers in states and municipalities, there is communication noise, as we can see in the posts below and also in the CSD 8 reports.

Figure 2. Posts from April 4, 2017, and April 7, 2017 (on this date, with some of the comments)
Source: Facebook @minsaude 2018.

It must be pointed out that health communication demands a strategy and action plan that meets the public's needs[6]. People want access to reliable information so that they can make their heath decisions. Therefore, if there is an official online vehicle of the Ministry of Health releasing new information, they do not expect to get a different direction when they arrive at the health service. This coherence between what was reported by the SUS on official social media and the reality of the services is crucial for health communication to have quality and resolution for citizens. For Araújo and Cardoso[14], the decentralization character of health communication is strengthened by the speed with which information is spread on social media. All the same, the federal administrator cannot ignore that the virtual media has expanded a greater dissemination of content. Hence, any information that is disseminated through social media before being disclosed to health professionals may lead to distrust and disbelief in the population concerning the Ministry of Health's position in changing the vaccination protocol already established and applied by the health services. It is not enough just to release information through institutional social media without first communicating and presenting the new protocol to their state and municipal staff through the communication advisors in those places.

It is well-known that communication is not seen as a priority in most Brazilian state health departments. Despite that, it is imperative that it is valued as a strategic and support area for the federal administrator's actions[15]. Communication with health professionals should not come after that with the public at large, as the former are the visible, daily, palpable, and direct contact of the Ministry of Health with the population. Moreover, it is worth emphasizing that society lives in a post-truth period, in which individuals are prone to believe less in objective facts and more in opinions and emotions, according to the speaker's degree of affinity and intimacy. The population somehow discredits government institutions, and this needs to be considered within the communication strategy on social media, given that, every time information is published in a way that is inconsistent with the reality of the SUS, the communication noise will impair people's understanding and decision-making about their own health. Furthermore, it will challenge the image of a reliable State that seeks to build itself both by workers who manage social media and by those who are in the daily life of management and health services.

Another important category refers to the existence or lack of content that identifies the Brazilian National Health System in the post, whether by the logo, by the name of the system, or just by the acronym SUS. The SUS was present in 455 posts (70% of the sample), which represents more than twice the number of posts that do not present any information about the health system. It can also be noted that the Presidency of the Brazilian Republic produced part of the sample in which the SUS logo was not included.

Respondents reported that the material created directly in the multimedia center did not have the SUS logo to avoid polluting the material and to help design. On the other hand, when produced by the advertising area of the Ministry of Health or for larger campaigns, the material contains the logo of the Ministry of Health and SUS. The presence of the logo in all communication material produced by the federal government is fundamental, since it is a way of stating the identity and presence of the SUS in the solution of problems and in the improvement of people's quality of life. It is common knowledge that the Brazilian health system is presented by traditional media to society focusing on negative aspects[16-18], and this leads to the need for the federal administrator to use health communication strategies to convey positive issues about the system. A recent study also pointed that not even the Brazilian Health Regulatory Agency (Anvisa) is identified as part of the SUS in Brazilian media texts, which reinforces the need for the federal government to inform that public health actions are part of the SUS. If not even the government does it, there is no way the media can be charged with releasing complete and correct information about the public health system[19].

The respondents also reported, as pointed out in the CSD 9, that the Ministry of Health's Facebook role is to present information that educates and guides the Brazilian population on topics of direct impact on their lives. Nevertheless, health education is just a long-term step and relationship with the audience to involve individuals and create consensus and a sense of belonging in the public[6]. Communication actions of the SUS must align with its guidelines of universality, integrality and equity. Furthermore, given that communication is understood as a right for all, it must consider the differences between people, services and communities; promote the circulation of multiple ideas (equity); be decentralized, identifying voices other than those authorized. It must also ensure social participation, and disseminate not only the thinking of health professionals, but also the social, economic and political determinants[14].

The word cloud below was produced from the content described in all posts selected for this study, apart from connectors and pronouns. The results indicate that #combateaedes is the most frequent term, followed by words such as 'health' and 'mosquito'. In reference to diseases, the results show that the word 'Zika' is the most recurrent, and subsequently 'Dengue', 'Chikungunya' and 'Yellow Fever',

following the Brazilian epidemiological situation in the researched period. It is worth noting that, by using a war vocabulary, the Ministry of Health bets on the campaign strategy for arboviruses. It has been already shown that the agency's communication is informational, without popular participation; the publications are focused on the adult mosquito; the expression "combat" - the most recurrent word - limits actions to the elimination of the vector; and the focus is on general mosquito prevention care[20].

Figure 3. Word cloud with the contents of posts about Dengue, Zika, Chikungunia, and Yellow Fever, from the @minsaude fan page, 2015-2017
Source: the author, based on the website WordArt (2018).

When analyzing the content of the main comments of the posts in the researched period, that is, those with greater users' engagement or higher number of identified reactions, it is noticed that the word 'NO' (indicating opposition) stands out, being followed by the words 'mosquito' and 'health', which are part of the semantic field of research. Attention is drawn to the large number of terms such as 'BUT' and 'SO', which imply disagreement and restriction, respectively.

Figure 4. Word cloud with the content described in the most engaged comment about Dengue, Zika, Chikungunya, and Yellow Fever, in the posts about arboviruses on the @ minsaude fan page, 2015-2017.
Source: the author, through the website WordArt (2018).

The workers pointed towards the attempt to answer the comments using technical arguments and seeking to understand the public's demands. On the other hand, in the period analyzed for this study, the agency worked harder on the logic of transmitting information than on the dialogue with users. Apparently, the process seemed similar to the proposal of Laswell's hypodermic theory, which is based on manipulation, overlooking the characteristics of the message receiver and treating him/her only as someone passive, someone who receives information and makes decisions following exactly what has been transmitted[21].

It is no wonder that this theory of communication, dating back almost 100 years, should not provide a basis for current social media communication actions, in which new relationships emerged from the internet, with a collective sense in the circulation of information, as disposed in *Todos* (everyone)[22]. In this approach, multiple voices echo whatever content transmitted to them; and this happens not in unison, but dialogically.

This stress on the informationist approach (materials on prevention) and on the dissemination of services without listening to people has already been observed in a previous study[23]. Actually, this institutional presence in the new media does not mean greater dialogue between health institutions and the public. A recent study on the positioning of Fiocruz on Facebook for topics that address Zika emphasized that the institution, also from the SUS and a reference in health communication in the country, neither responds to public comments nor encourages dialogue, and it used, at the time in which the study was conducted, formats with lower potential for engagement[24].

Facebook is currently the main social media for Brazilians looking for news[25.] Hence, it is suggested that the Ministry of Health, apart from disseminating content, also makes use of specific and sustainable strategies to provide qualified dialogue with users, without going into the benefits of specific local issues for topics that depend on municipal coordination. This can be done, for example, without the merits of specific local issues for themes that depend on municipal articulation, without resorting to just ready-made answers, but instead organizing the workflow to benefit from users' queries and comments, aiming, for instance, to produce new content based on such doubts.

On the social media of a federal agency, it is essential to announce clearly the role of states, municipalities and health services, as well as their particularities, limitations and possibilities, instead of presuming that people already know the role of each federated entity - as this information is not part of people's daily knowledge.

Another aspect that deserves attention is the Brazilian political polarization, also reflected on social media. The federal administrator must seek ways to circulate health information between opposing groups, preventing certain information from circulating only among those who are in favor or against a certain political group[26]. The need for specific professional qualification for social media workers should also be considered, as well as an expansion of the team focused exclusively on social media, which is a strategic space that should be prioritized among the Ministry of Health's investment needs in communication.

Conclusion

The aim of this study was to describe health communication on social media, particularly how the arboviruses topic was introduced on the Ministry of Health fan page from the perspective of a mixed study. The topics presented over three years address primarily the Zika virus, with a greater perspective on prevention and targeting the public at large, with content supported by technicians in the area of health surveillance. The findings also showed that the work process must be improved, using a strategy that allows a greater dissemination of information and communication flows between the federal administrator and health workers at higher speed to guarantee that the same information presented on social media is endorsed by the health services.

Another aspect that should be reviewed is that the SUS must be included in all posts produced by the Ministry of Health. This is because, if the SUS logo or name is not ubiquitous in the posts produced by the federal administrator, there is no point to demand that the population have a better understanding of the system and value it.

Health communication should not be limited to the transmission of messages and persuasion. Particularly on social media, the health agency needs to establish public debate on the issues addressed, and with each post ensure that people can get enough information to increase their participation in health policies and improve their quality of life. It is of the utmost importance to invest in content and strategies that not only provide information, but also communicate about health in a dialogical way, using the opportunity to listen to people offered by the online social media.

There is an urgent need to implement a SUS communication policy that encompasses strategic and integrated actions in the three governmental spheres, allowing Brazilians to know and take control of the system. A policy that also presents the need for improvement and ongoing education for the SUS communication professionals. A policy that establishes partnerships with institutions, such as Fiocruz, in the composition of this framework committed to health communication, aiming to increase people's access to quality information that improves their lives.

Although it seems ambitious, this is feasible as long as it is understood that health communication demands investment. Practices based only on the transmission of information and allocation of resources just for promotion (including that of federal administrators) take the place of the formation and implementation of innovative and customized strategies, suitable to people's needs, and thereby closer to them and their communities. In brief, it is imperative to create relationships with people, and not just determining what should or should not be done.

We identified the following aspects as research limitations: 1. Low participation in the research study by professionals who met the inclusion criteria; 2. Dynamic social media data collection, with numbers changing permanently; and 3. Limited literature available about the work of journalists and communication professionals on social media - which points to a field that needs further research. This research may allow new studies, specifically bringing the content presented by the public in the comments of the posts and explaining in more detail specific cases in the analyzed period, such as the Yellow Fever vaccination, described in this paper. Another issue that deserves further study is the specific analysis of the discourse of posts on prevention, which was more prevalent in the analyzed sample. It should be confirmed whether the posts reduce prevention to single actions of individual accountability or if they present the social health determinants and the role of public policies in this prevention. The agency will hardly address in its posts any criticism about its performance, nor how this hinders the prevention of diseases. Despite this, this topic deserves to be explored in further studies.

Finally, we emphasize that public health institutions must improve their online strategies as a direct channel with the population. Although influencing a decision in health is not limited to just reading a post, it is of paramount importance that more and more quality health information is accessible to people through as many channels as possible and in different formats.

Authors' contribution

All authors actively participated in all stages of preparing the manuscript.

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Conflict of interest

The authors have no conflict of interest to declare.

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A pesquisa analisa a produção de conteúdos sobre arboviroses na *fanpage* do Ministério da Saúde do Brasil antes, durante e após a epidemia de Zika vírus, com estudo de métodos mistos englobando análise do conteúdo divulgado entre 2015 e 2017 e o Discurso do Sujeito Coletivo (DSC) dos trabalhadores que produziam os conteúdos. Dos 5.732 *posts* coletados, 649 deles eram sobre arboviroses, com enfoque maior relacionado à prevenção e à Zika. O Sistema Único de Saúde (SUS) aparece em pequena parte da amostra. Há preocupação em comunicar saúde com qualidade e respaldo técnico, mas diferenças na linguagem do especialista e no *timming* entre o que é publicado on-line e o repassado aos serviços de saúde ocasionam ruídos. O discurso é transmissional, apresentando ausência de diálogo com a população, subestimando o potencial que a rede social tem para interação, compartilhamento e engajamento.

Palavras-chave: Redes sociais virtuais. Comunicação em saúde. Saúde na comunicação de massa. Arboviroses. Prevenção.

La investigación analiza la producción de contenidos sobre arbovirosis en la *fanpage* del Ministerio de Salud de Brasil antes, durante y después de la epidemia de Zika virus, con estudio de métodos mixtos englobando análisis del contenido divulgado entre 2015 y 2017 y el discurso del sujeto colectivo de los trabajadores que producían los contenidos. De los 5.732 posts colectados, 649 eran sobre arbovirosis, en un enfoque mayor relacionado a la prevención y al Zika. El Sistema Único de Salud aparece en una pequeña parte de la muestra. Existe la preocupación de comunicar salud con calidad y respaldo técnico, pero diferencias en el lenguaje del especialista y en el *timing* entre lo que se publica *online* y lo que se traspasa a los servicios de salud causan ruidos. El discurso es de transmisión, con ausencia de diálogo con la población, subestimando el potencial que la red social tiene para la interacción, compartición y compromiso.

Palabras clave: Redes sociales virtuales. Comunicación en salud. Salud en la comunicación en masa. Arbovirosis. Prevención.