

The effects of covid-19 pandemic on children's antivaccination discourse in Facebook

Os efeitos da pandemia de covid-19 no discurso antivacinação infantil no Facebook

Los efectos de la pandemia de covid-19 sobre el discurso antivacunación infantil en Facebook

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ABSTRACT

This study analyzes how anti-covid-19-vaccination discourse has impacted childhood vaccination discourse on social media in Brazil and identifies the legitimization strategies and narratives employed. To this end, more than 260,000 Facebook (Meta) posts about childhood vaccination from 2019 to 2022 were analyzed, focusing on understanding: what discursive strategies were used to legitimize the anti-vaccine and pro-vaccine discourse during this period, what main narratives were constructed, and how the covid-19 pandemic impacted this discussion. The results indicate a growth and polarization of the debate about childhood vaccination on social media, with the circulation of discourse propagating disinformation and conspiracy theories. In the context of the pandemic, it was observed that the anti-vaccine discourse progressed from its initial focus on the covid-19 vaccine to encompass childhood vaccination in general. These changes had an impact on the pro-vaccine discourse, which adapted in an attempt to take account of the claims raised by the anti-vaccination movement.

Keywords: Childhood vaccination; Discourse; Social media; Facebook; Covid-19.

RESUMO

Este trabalho pretende analisar como o discurso antivacina sobre a covid-19 impactou o discurso sobre vacinação infantil no contexto da mídia social, a partir das estratégias e narrativas de legitimação construídas. Para isso, realizamos uma análise de mais de 260 mil publicações sobre vacinação infantil no Facebook (Meta) entre os anos de 2019 e 2022, com o objetivo de compreender: quais foram as estratégias discursivas utilizadas para legitimar o discurso antivacina e pró-vacina nesses anos; quais as principais

narrativas construídas; e como a pandemia de covid-19 impactou nessa discussão. Os resultados indicam um crescimento e uma polarização do debate sobre vacinação infantil na mídia social, com a circulação de discursos desinformativos e conspiratórios. No contexto da pandemia, observamos que o discurso antivacina saiu da vacinação infantil contra a covid-19 e se espalhou para o debate sobre a vacinação infantil para outras doenças. Essas mudanças têm um impacto no discurso pró-vacina que se modifica para tentar responder ao movimento antivacinação.

Palavras-chave: Vacinação infantil; Discurso; Redes sociais; Facebook; Covid-19.

RESUMEN

Este trabajo pretende analizar cómo el discurso antivacunas sobre la covid-19 impactó en el discurso sobre la vacunación infantil en el contexto de las redes sociales, a partir de las estrategias y narrativas de legitimación construidas. Para ello, realizamos un análisis de más de 260 mil publicaciones sobre vacunación infantil en Facebook (Meta) entre 2019 y 2022, con los objetivos de comprender qué estrategias discursivas se utilizaron para legitimar el discurso antivacunas y provacunas sobre los años; cuáles fueron las principales narrativas construidas; y cómo la pandemia de covid-19 impactó esta discusión. Los resultados indican un crecimiento y una polarización del debate sobre la vacunación infantil en las redes sociales, con la circulación de discursos desinformativos y conspirativos. En el contexto de la pandemia, observamos que el discurso antivacunas dejó la vacunación infantil contra el covid-19 y se extendió al debate sobre la vacunación infantil para otras enfermedades. Estos cambios tienen un impacto en el discurso provacunas, que cambia para responder al movimiento antivacunación.

Palabras clave: Vacunación infantil; Discurso; Redes sociales; Facebook; Covid-19.

INFORMATION ON THE ARTICLE

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INTRODUCTION

Brazil has a national immunization program that is an international reference (DANDARA, 2022) and was a pioneer in the eradication of smallpox (FIORAVANTI, 2021), almost a decade before the World Health Organization (WHO) recognized its eradication worldwide. Although the country has a nationwide public health system that has the capacity for the mass vaccination of the population from infancy to old age, there has been a sharp drop in childhood vaccination uptake since 2015, potentially paving the way for the resurgence of epidemics of the like not seen for decades (NUNES, 2021).

Since the covid-19 pandemic, vaccination coverage seems to have further declined. In 2020, it was less than 80% for all vaccines, and fewer than half of the country's municipalities achieved the goal set in the national immunization program (NUNES, 2021), meaning vaccination rates fell below the level deemed necessary to guarantee the eradication of many diseases. Although this may in part be attributed to the success of the national program and the vaccines themselves, in that some diseases have been eradicated or reduced to a very low incidence, meaning that some people have stopped worrying about them or them or ceased to be aware of them (MACDONALD; SMITH; APPLETON, 2012), there are other factors at play, such as the spread of conspiracy theories and broader risk narratives, lack of knowledge, religious positions, and even a powerful wave of disinformation (PERTWEE; SIMAS; LARSON, 2022; ULLAH *et al.*, 2021).

Another phenomenon seen during the covid-19 pandemic was that political disputes were instrumental in amplifying and legitimizing the discourse of those who were against the covid-19 vaccines and global initiatives to fight the virus (RECUERO; SOARES, 2020; RECUERO; STUMPF, 2021), mainly through the increasing use of social media platforms. The hypothesis that this amplification impacted not only the public debate about the disease, but also vaccination in general, has been raised by several authors (ULLAH *et al.*, 2021).

This study therefore seeks to explore how the anti-covid-19-vaccine discourse, perpetuated on these same social media platforms, impacted the general discourse on childhood vaccination. Specifically, the aim is to understand how the strategies and narratives developed in this context may have been amplified to legitimize a broader discourse against the vaccination of children to the point of affecting social practices. To this end, the analysis uses Social Network Analysis (WASSERMAN; FAUST, 1994) to observe the pages and groups that most engaged with the most shared links, followed by an analysis of the texts (narratives) constructed by these groups through Critical Discourse Analysis (CDA) (VAN DIJK, 1993).

Considering that today the majority of the Brazilian population have access to the Internet – 83% of households, according to data from an official survey of information and communication technology usage (TIC DOMICÍLIOS, 2020) – and that social media platforms are used as sources of information by about half of the population (*ibid.*), a longitudinal analysis is conducted with the aim of picking up on transformations in the discourse on the subject over a period of four years on Facebook (Meta), one of the most popular platforms in the country. Data gathered from more than 260,000 posts that mention childhood vaccination published in groups and public pages between 2019 to 2022 are analyzed to observe how this discourse seems to have changed over the four years together with some potential implications of these changes. The main results include a notable increase in anti-vaccination discourse against the covid-19 vaccines and its spread to other childhood vaccines.

THEORETICAL FRAMEWORK

Anti-vaccine discourse

Anti-vaccine discourse is not a new phenomenon, but it is one that has gained strength in Brazil in recent years (BROTAS *et al.*, 2021). The arguments it harnesses have spread and been legitimized more explicitly on social media platforms than elsewhere, and with a more evident impact (KATA, 2012). Indeed, social media seem to have brought the anti-vaccine debate, which was previously restricted to specific communities, to the public sphere. In addition, the latest anti-vaccine discourse seems to be more strongly associated with disinformation¹ and conspiracy theories in these spaces (RECUERO; SOARES, 2020), spawning uncertainty about vaccine efficacy. This has in turn reignited the debate on vaccination, albeit on the basis of different arguments, which go beyond issues such as the need to vaccinate, the benefits, and the side effects to actually questioning the very origin of the vaccines (RECUERO; STUMPF, 2021). In such a context, it is increasingly important to understand the discursive mechanisms used to legitimize and thus give visibility to the arguments against vaccination.

Brotas *et al.* (2021) explain that for the actors engaged in anti-vaccine movements, social media have become a way of publicizing their ideas without the intermediation of traditional media. In addition to the social actors involved, it is necessary to consider the importance of the affordances of the platforms and their algorithms in mediating anti-vaccine discourse, since they also define the flows of information and how it is recommended (D'ANDRÉA, 2020). These algorithms can also exacerbate the echo chamber effect (RECUERO; SOARES, 2020), whereby the recommendation of given anti-vaccine content will increase in response to any interaction with it, thereby reducing the circulation of content that may contradict disinformation about immunization, for example. This may lead to the creation of self-perpetuating “bubbles” of anti-vaccine discourse that cannot be penetrated by discourses with different views and therefore does not have its legitimacy challenged. The more these texts circulate in such bubbles, the more they appear to be the argument “of the majority” and the more their content is likely to gain traction.

In the context of a pandemic like covid-19, the resurgence of anti-vaccine movements jeopardizes public health management strategies based on mass vaccination of the population (RUISCH *et al.*, 2021). For the authors, societies divided by anti-vaccine movements suffer from increased vaccine hesitancy, hampering the management of the public health situation. In addition, such discourse spread throughout society, affecting not only specific vaccination campaigns, but the attitudes of entire communities towards vaccination, which could end up enabling the resurgence of other preventable diseases and even an increase in infant mortality, as has been observed in Brazil (NUNES, 2021).

According to Costa (2022), the anti-vaccine discourses circulating on social media are based on distortions of facts, which are taken out of their original context or mixed with false content – which is also characteristic of disinformation – making it hard to distinguish between what is scientifically proven and what is fabricated. Costa (2022, p. 42) also states that in some cases, this discourse describes the “before and after” of people who have been vaccinated, reporting on “what it was like before an individual was vaccinated, what happened afterwards, and how they are now”. She also argues that anti-vaccine discourse could be strengthened by the fact that people have no time and/or inclination to delve into the facts, making them more likely to absorb whatever information comes their way without questioning its veracity. In some cases, parents question cultural and legal considerations surrounding mandatory childhood vaccination (BARBIERI; COUTO; AITH, 2017). According to these authors, there is a movement that is questioning the

¹ Disinformation is understood here as a set of contents that is wholly or partially false, as understood by Recuero and Stumpf (2021).

mandatory nature of childhood vaccination campaigns, in terms both of their social acceptance and their legal justification, which then feeds back into conspiracy thinking. What is more, social media platforms provide the means for these actors to produce and share their content, enabling it to travel freely between groups, even when it is fake or misleading.

As we can see, anti-vaccine discourse is couched in multiple narratives that together provide a context propitious for mistrust in the vaccination process. The most commonly used arguments involve: discrediting the science and scientists responsible for producing vaccines; the influence of Big Pharma, which finances and profits from vaccines; and the safety and potential side effects of vaccines (KATA, 2012). In Brazil, as noted by Recuero and Stumpf (2021), the anti-vaccine discourse on these platforms is also anchored in a broader context that legitimizes these narratives through a political lens, whereby the decision as to whether to take a vaccine indicates support for or opposition to a particular political position.

Strategies and narratives of anti-vaccine discourse

CDA is a way of perceiving and studying discourse by observing the relationship between its structures and strategies and the modes by which it reproduces relations of power and domination (VAN DIJK, 1993). The study of discourse is thus the study of texts and relationships as social practices emerging from these texts and how they exert power. In this framework, discursive strategies constitute “systematic modes” of language use designed to achieve “social, political, or psychological objectives” (WODAK, 2005, p. 4). These strategies are connected with forms of persuasion through discourse and therefore seek to convince subjects through discourse (VAARA, 2010). A discursive strategy is therefore expressed in a regularity in forms of speech that can be identified as a specific use of language designed to induce someone to do something. We might say, then, that the study of anti-vaccine discourse strategies is important for bringing this discourse to light and understanding how it is structured, how it is reproduced, and how it spreads knowledge (or lack of knowledge) about vaccines and their possible effects on the social relations and communities through which it circulates.

Wodak (2005) systematizes some of the discursive strategies used for the legitimation of discourses (Table 1). According to Wodak (2005), these strategies allow us to observe how a particular discourse is articulated in the context of certain ideologies, which help build and galvanize particular narratives. These ideologies can also be perceived in interdiscourses and intertextual references in the narratives, which allow one discourse to operate through its connection with another, thus building new narratives for their legitimation. This legitimation then itself has an impact on the social practices of the actors. These elements also cause one discourse to appear in association with another, such as anti-vaccine and religious discourse, as shown by Costa (2022); that is, in a kind of legitimation of one discourse by the same actor responsible for legitimizing another.

Table 1 - Discourse Strategies

Strategy	Objectives
Referential nomination	Discursive construction of social phenomena, objects, actors, etc.
Predication	Discursive qualification of social phenomena, objects, actors, etc. Articulation of otherness, deprecating “others”.
Argumentation	Justification and questioning of claims of “truth”, certainties, or correctness.
Perspectivation, framing or discursive representation	Positioning of the writer’s/speaker’s perspective; how the speech is framed.
Intensification or mitigation	Modification – intensification or reduction/mitigation – of the illocutionary force of utterances.

Source: Adapted from WODAK, 2005.

Anti-vaccine narratives have also been widely explored in the literature (GUNARATNE *et al.*, 2019; KATA, 2012; OLIVEIRA *et al.*, 2021; RECUERO; STUMPF, 2021) and demonstrate that vaccine resistance is a growing problem in Brazil and worldwide. Studies of the factors that lead to this resistance found that individual, contextual and clinical characteristics (such as religion, age, and lack of symptoms associated with covid-19) during the pandemic were instrumental in adults' decisions about whether or not to take the vaccine (OLIVEIRA *et al.*, 2021).

More recently, several studies have also identified these narratives and their connections with covid-19 vaccination. For example, Amaral *et al.* (2022) made a comparison of anti-vaccine discourse in Brazil and Germany in which they identified some common features, namely: (1) mistrust of vaccination; (2) vaccination as a violation of individual rights; (3) inefficacy of vaccination; (4) skepticism about science; (5) anti-vaccination to protect children and young people; (6) politicization of vaccination; (7) search for alternatives to vaccination; (8) people against vaccination as victims of a social divisions; (9) censorship of information; (10) advocacy of using natural immunity to fight the virus; and (11) assertion that the main aim of vaccines is to make profits for the pharmaceutical industry. The features of anti-vaccine discourse identified as being most prevalent in Brazil were the politicization of vaccination, the search for alternatives to vaccination and the alleged violation of individual rights. Additionally, deep skepticism towards vaccines was found in both countries, along with an intersection between political alignment and anti-vaccine sentiment.

A similar story was uncovered by Recuero and Stumpf (2021) and Oliveira (2020), who discuss discourses around covid-19 vaccination in Brazil. The politicization of the vaccine, coupled with interference from political discourse, seems to have made the debate less about public health and more about politics and politicians. In this context, Camargo (2022) identified four discursive strategies associated with the anti-covid-19 vaccine discourse on Facebook: (1) intersectionality with Christian morality; (2) support for alternative treatments or views on health; (3) negation of institutions; and (4) challenging of the scientific and marketing discourse of the pharmaceutical industry.

All these studies point to specific narratives permeating the legitimation of the anti-vaccine discourse. However, little is discussed about how these narratives are articulated discursively, how they spread, and what effects they may have on social practices – which is the main objective of this work. In addition, these studies also point out two important elements that occur within these exchanges. One is the reference to “conspiracy theories”, which make reference to master narratives about secret plans involving powerful actors our to influence elements of society and the world (BERTIN; NERA; DELOUVÉE, 2020). These narratives have gained traction with digital and, particularly, social media platforms, and also as a result of what has been referred to as the “epistemological crisis” in science (OLIVEIRA, 2020). This means that conspiracy theories began to appear more on social media, driven not only by the platforms' algorithms, but also by the crisis of belief pervading the present-day context, particularly during the covid-19 pandemic, which proved propitious for the spread of such ideas (BERTIN; NERA; DELOUVÉE, 2020).

Conspiracy theories are also frequently associated with an ecosystem of disinformation (RECUERO; STUMPF, 2021) – another important element for the discussion. Essentially, disinformation consists of a set of actions and contents whose intention is to deceive or induce error (WARDLE; DERAKSHAN, 2017). It is something that some anti-vaccine discourse may draw on to reach more people. Disinformation aligned with anti-vaccine discourse has been identified by several authors (BROTAS *et al.*, 2021; CAMARGO, 2022; MASSARANI; LOYAL; WALTZ, 2020), also often in association with anti-vaccine sentiment (MACI, 2019).

METHODOLOGY

As explained above, this study seeks to understand the changes in discourse about childhood vaccination in public Facebook groups and pages during the covid-19 pandemic. Specifically, the aim is to understand the discursive strategies and narratives involved and their possible effects. To this end, historical data were collected from the first five months of 2019, 2020, 2021 and 2022 using CrowdTangle², a platform that allows access to public and historical data from Facebook through its Application Programming Interface (API). The data were collected from these pages and groups (which were considered to be the same type of node) that shared vaccine-related content using specific combinations of keywords: “vaccine/vaccines/vaccination” (*vacina/vacinas/vacinação*) together with “child/children/childhood” (*criança/crianças/infantil*). Table 2 shows a breakdown of the data obtained.

Table 2 - Total data obtained from Facebook (Meta)

	2019	2020	2021	2022
Pages/Groups	12,127	26,762	46,652	154,585
Posts with links	8,273	23,061	44,876	172,385
Total posts	14,707	26,830	50,810	180,420

Source: Own data.

Having gathered the data, the next step was to understand the central elements of this research based on some key points: 1) the structure of the network through which this content is spread; 2) the discursive strategies used; 3) the types of pages/groups related to each type of discourse and how they articulate discursive and narrative strategies; and 4) the changes in this discourse during the covid-19 pandemic.

Social Network Analysis (WASSERMAN; FAUST, 1994) was used to analyze the structure of the networks, building networks of the interactions of the sources and their contents. A bipartite network (RECUERO; BASTOS; ZAGO, 2015) was used, in which the nodes of the network represent pages/groups and the shared content and the connections represent the effective shares. To observe these networks, a groupability algorithm was first used to identify the modularity and connect the accounts that tended to reproduce the same content and separate them from the ones that shared different content (BLONDEL *et al.*, 2008). Once grouped in this way, it could be seen which were the main groups sharing content on vaccination and what type of content was shared most. Using network analysis metrics, it was possible to identify which pages and groups shared the most content (out-degree) and which content was shared the most (in-degree).

Once the pages and groups had been clustered together, the clusters that effectively shared content related to childhood vaccination, that contained at least twenty pages/groups, and that had shared at least five items on the target subject were selected. The first criterion was because the network analysis revealed that some groups were outside the scope of the research (for example, groups and pages of vets and pet shops focused on pet vaccination as a way to protect children as well). The cutoffs of twenty pages where at least five items were shared were selected to focus on the groups that were most active in sharing content. Table 3 summarizes the data that were analyzed after this preliminary selection process. The networks presented below were prepared using Gephi.

² CrowdTangle is a public data collection tool provided by Facebook (Meta). The system is accessed through a specific website and API (<https://www.crowdtangle.com>). CrowdTangle does not collect all the data, only the public data that is indexed by the API.

Table 3 - Data grouped for analysis

	2019	2020	2021	2022
Nodes	699	4,155	5,613	19,494
Connections	752	5,391	7,531	33,341
Clusters	1	2	2	2

Source: Own data.

Based on the out-degree, the main types of pages and groups in each cluster were also identified and classified. This gave an understanding of what types of influencers were connected with the discourses prevailing in each group. Once the groups/pages that were most involved in sharing content on childhood vaccination were identified, the content itself was analyzed; i.e., the posts themselves.

To understand the discourse present in the clusters, occurrence and co-occurrence analysis was used, drawing on Connected Concept Analysis (LINDGREEN, 2016). This approach also enabled an analysis of the strategies used to legitimize the discourse (WODAK, 2005): referential nomination, predication, argumentation, framing, discursive representation, and intensification or mitigation. For this, the posts present in each cluster identified in the previous analysis were extracted to observe the terms that occurred the most in each discursive unit (in this case, each individual post) and subsequently classified into broader concepts. Thus, words with similar meanings, such as “Brazilians,” “Brazilian,” or “Brazil”) could be grouped under the same concept. For this classification, the posts were also read and discussed by the researchers with a view to allocating their meaning to the units of analysis.

Once the group of concepts had been constructed, co-occurrences in each group were observed to find out how and how often each datum appeared together with another in the same unit of analysis. These co-occurrences provided a discursive map of the most connected concepts in the posts analyzed. This strategy was used to analyze the discourse of the different groups observed using Social Network Analysis, bringing forth the similarities and differences in the associations of these groups to the concepts of vaccine and vaccination.

The concepts are presented in networks, where their size corresponds to their frequency in the data (the more cited, the larger they appear) and their proximity to each other corresponds to the strength of their mutual association. Gephi was also used to represent these networks. This map of conceptual relationships revealed the most frequent discourse in the posts of these most active groups and the content they published.

CASE STUDY

General analysis

The analysis of the data begins with a presentation and a discussion of the data per year, followed by a general systematization. To facilitate understanding, the groups perpetuating anti-vaccine discourse are marked in blue, and the groups perpetuating pro-vaccine discourse are marked in red. In both cases, the analysis focuses exclusively on childhood vaccination.

The first year (2019) was the one that had the smallest volume of data (Figure 1). Only one cluster was identified (red – pro-vaccination), with 699 nodes and 752 posts with links. The discourse related mainly to publicity for childhood vaccination campaigns in Brazil (Figure 2) by local authorities, health institutions, and groups of parents. The most prevalent discourse referred directly to several campaign-related elements, connecting immunization directly to the public health system, making reference to campaigns and providing information on various diseases like polio, measles, influenza, etc.

As for the discursive strategies (WODAK, 2005), there was a very explicit pro-vaccination bias, with nomination of the diseases that can be prevented by vaccination as the main discursive strategy in the vaccine-related and vaccination campaign discourse. There was a positive predication, related to knowledge about these campaigns and the prevention of diseases among children. No specific framing was observed, since the actions were basically designed to spread the word about the campaigns, and no intensification was identified, as this discourse was basically informative.

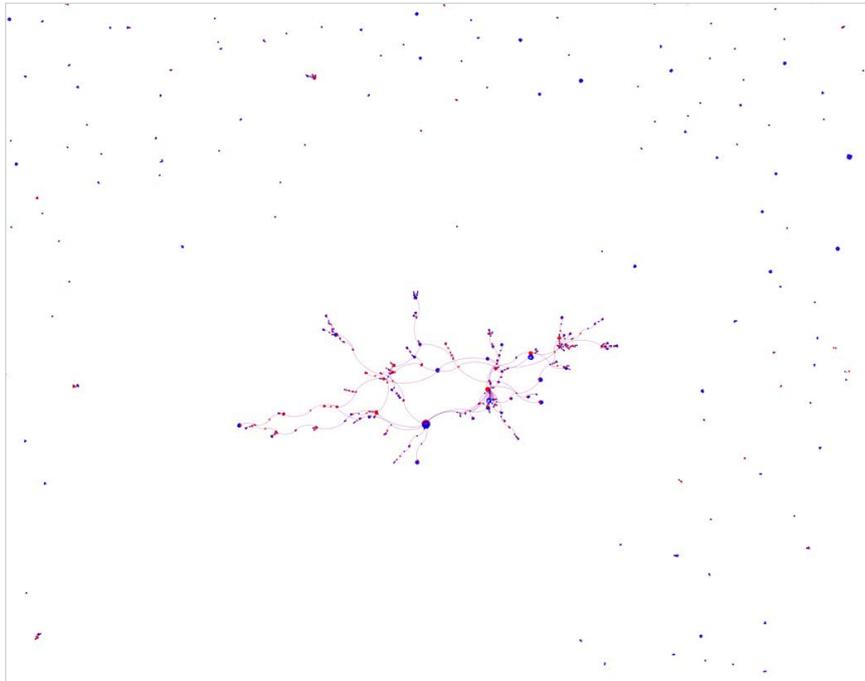


Figure 1 – Data from 2019. Main influencers: vaccination clinics, local authorities, local and state entities involved in health
Source: Own data.

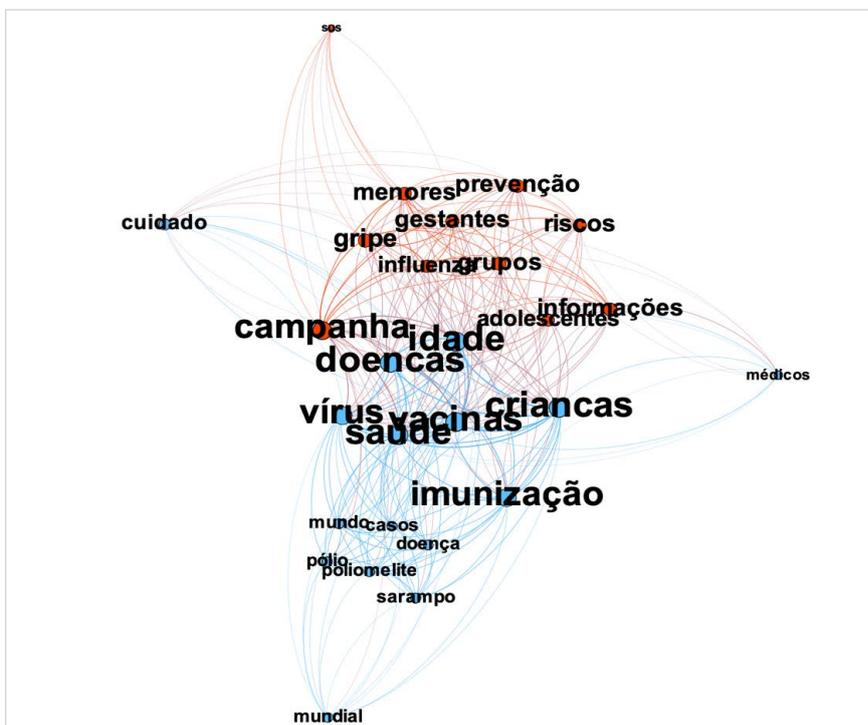


Figure 2 – Data from 2019. Discourse: main topics present in the discourse and their connections
Source: Own data.

The data from 2020 (Figure 3) already reveal some major differences. There is an increase in the discussion of childhood vaccination, with the appearance of a new cluster debating the subject (4,155 nodes, almost six times bigger than the cluster in 2019), and there is more content circulating on the subject. This is the first time that an anti-vaccine cluster (blue) appears, alongside the cluster focused on vaccination as disease prevention (red). In the red cluster, the main nodes continue to be the institutional accounts of local authorities and health agencies, whose discourse is related to child vaccination campaigns.

In the strategies (WODAK, 2005), the focus is on vaccination campaigns and vaccine safety, naming the population groups who should be vaccinated (pregnant women, older people, risk groups, and children) (Figure 5). The other strategies are the predication of this disease-prevention, and thus pro-vaccine discourse. Further, there is an intensification related to disease prevention vis-a-vis 2019 and its discourse. The framing is to avoid diseases and ensure children and the population at greater risk have access to vaccines. Few changes were observed in relation to the previous year.

In the other cluster (blue), the main discourse is of resistance to and questioning about vaccination (Figure 4). Here, the groups and pages are mostly related to aspects of conspiracy, religious content and support for the Armed Forces. The prevailing discourse associates vaccination with conspiracy theories that claim, among other things, that vaccines are used for population control in Africa and caused the deaths of thousands of children, and that only God can save Europe, which at the time was the epicenter of the pandemic, with peaks of cases and deaths.

Let's be guineapigs for coronavirus vaccines!

Approximately 50 children in the small African village of Gouro, in northern Chad, sadly suffered [with] the “MenAfriVac” vaccine, developed specifically for Africa, supposedly to “cure” meningitis and was promoted and supported by the billionaire eugenicist and advocate of population reduction, Bill Gates. The vaccination caused 7-year-old children to suffer hallucinations, seizures and paralysis [...]. (Retrieved from Facebook group, 2020)

A clear political bias was also found, especially in groups supporting the current president of Brazil, Jair Bolsonaro and, to a lesser extent, in groups from towns. This discourse is more related to criticism of the actions to contain covid-19 and support for the president and his actions. Child vaccination appears in association with political issues, especially the expectation that any covid-19 vaccine would be part of a conspiracy:

Parents are afraid to take [their] children to health centers, but risk of not vaccinating is high – NATIONAL REPRESENTATIVE OF CHEGA ARGUES THAT PEOPLE SHOULD “REALLY NOT EVER, EVER” GET VACCINATED [...]. We shouldn't be “taken in by the pharmaceutical lobby” that makes vaccines just to maintain its “multi-million-dollar” #COVID business.

#GLOBOLIXO³ NEVER CARED ABOUT ELDERLY CHILDREN AND THEIR FAMILY. They owe billions to BNDES [national development bank], it [Globo] took 1 billion a year from the government, not to mention state-owned companies and backhanders. So, folks, it seems that a lot of people didn't understand what President Bolsonaro said about “just a cold” [...]. (Retrieved from Facebook group, 2020)

What emerge in these data are associations between religion, conspiracy theories, and disinformation about vaccination, corroborating the findings of other researchers (BROTAS *et al.*, 2021; CAMARGO, 2022; MASSARANI; FAITHFUL; WALTZ, 2020; OLIVEIRA, 2020). Perhaps one of the most important points is the resurgence, in the first year of the covid-19 pandemic, of these discursive associations between vaccines,

3 Translator's note: This hashtag is a portmanteau of the words “globo” and “lixo”. “Globo” is the name of a Brazilian media conglomerate that supported vaccination during the covid-19 pandemic, and “lixo” means “garbage”.

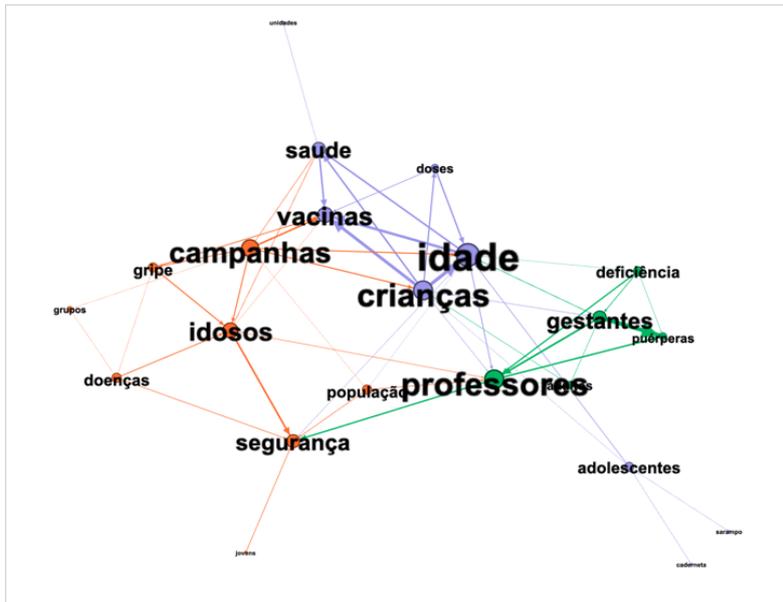


Figure 5 - 2020 data: Cluster 2 discourse (vaccination campaigns)
Source: own data.

The 2021 data (Figure 6) show an intensification in the circulation of anti-vaccine discourse and content on vaccines in general, with 5,613 nodes and almost 8,000 posts. Again, there are only two clusters: anti-vaccine discourse (in blue) and pro-vaccine discourse (in red). However, this time the pro-vaccine cluster involves a large number of political influencers and fewer institutional or public health-related accounts, with a similar trend being seen in the other group. The data therefore suggest an increased polarization of the discourse on vaccines and the association of vaccination with political alignments, mainly due to the debate around covid-19 vaccines (corroborating the findings of Recuero and Stumpf, 2021).

In the pro-vaccine group (Figure 7) there are messages highlighting vaccine safety and the need for people, especially health workers and children, to get vaccinated. As for the strategies (WODAK, 2005), vaccines are strongly associated with immunization and safety as a predication, and a new word, “right”, appears in relation to childhood vaccination. Again, the strategy of naming target vaccination groups is maintained, but now it comes alongside arguments and affirmations about the safety and action of vaccines. The intensification of this discursive thrust appears in association with an incipient discussion of anti-vaccine arguments.

In the anti-vaccine cluster (Figure 8), strategies (WODAK, 2005) involving questioning the covid-19 containment measures can be seen, with the nomination of elements such as mask wearing and social distancing, content on the lack of safety of vaccines, in particular covid-19 vaccines, and the argument that the best vaccine for children is to reduce “hunger”, alluding to the restrictive measures recommended by the WHO and questioned by Bolsonaro. Below are some examples of this anti-vaccine discourse:

Friends, I am sharing my article “herd immunity, the tip of the iceberg and vaccines.”
Pandemics and epidemics are a force of nature. The more contagious a new virus is, the more it spreads, without respecting quarantines and lockdowns. It will only be contained by another powerful phenomenon of nature: collective or herd immunity. [...]

It sounds like it could be a joke, but it isn't. About vaccines.... Can someone explain, please, why my “roasted peanut” IQ can't follow the reasoning... - Can pregnant women take it? - NO! - What about children? - NO! If I'm vaccinated: 1. - Can I stop wearing a mask? - NO! 2. - Can restaurants reopen etc.? And everyone work normally? - NO! [...] So the injection doesn't give immunity. It doesn't eliminate the virus. It doesn't stop death. It's no guarantee that you won't be contaminated. It doesn't stop you from “getting” COVID-19.

It doesn't stop you from having covid-19. It doesn't eliminate the need for travel bans. It doesn't eliminate the need to do deals. It doesn't eliminate the need for closures in general. It doesn't eliminate the need to wear masks. So... What does the vaccine really do?????? The "hunger" virus kills 8,500 children every day and the vaccine exists! It's called "food"! (Retrieved from Facebook group, 2021)

These data reveal an increasingly vocal anti-vaccine lobby using strategies related to argumentation and predication – mainly focused on the association between vaccines and supposed argumentative fallacies and arguments designed to counter pro-vaccine arguments, with examples of things that are “more important”. There is also the nomination of the flu vaccine, which is associated with this discourse for the first time. Again, conspiracy theories (BERTIN; NERA; DELOUVÉE, 2020; CAMARGO, 2022) and disinformation emerge intersecting with political and religious discourse as part of the framing, seeking to discredit vaccines, mainly within the context of the pandemic. These connections are also associated with predication (discrediting) and intensification of the anti-vaccine discourse.

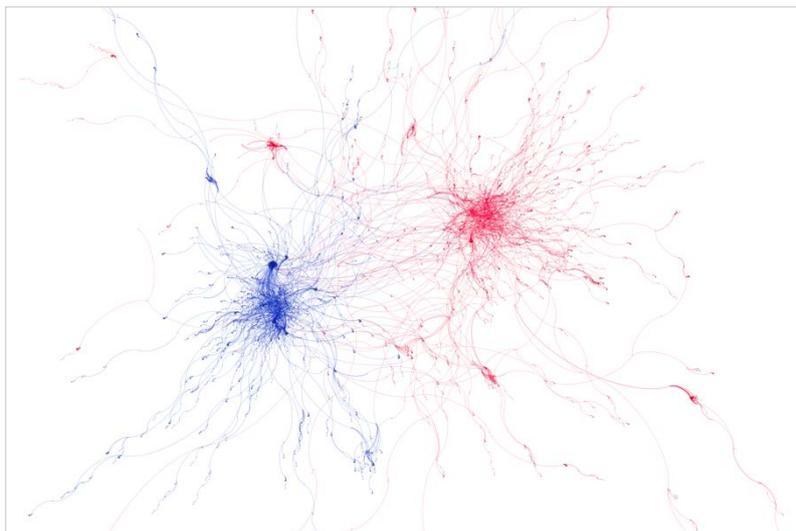


Figure 6 - Data from 2021. Main influencers: Cluster 1 (blue) – left-leaning groups and left-wing and pro-Lula parties; Cluster 2 (red) – pro-Bolsonaro pages and supporters of his government. Source: Own data.

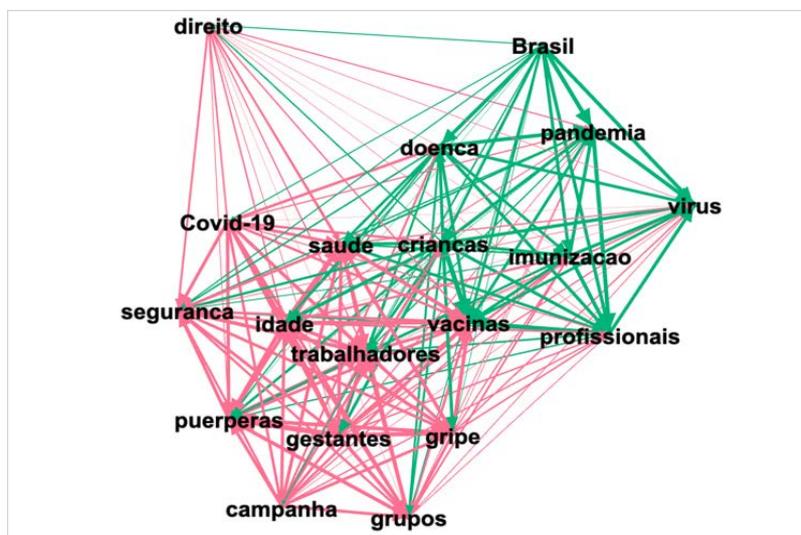


Figure 7 - 2021 Data - Cluster 1 (pro-vaccine) discourse Source: Own data.

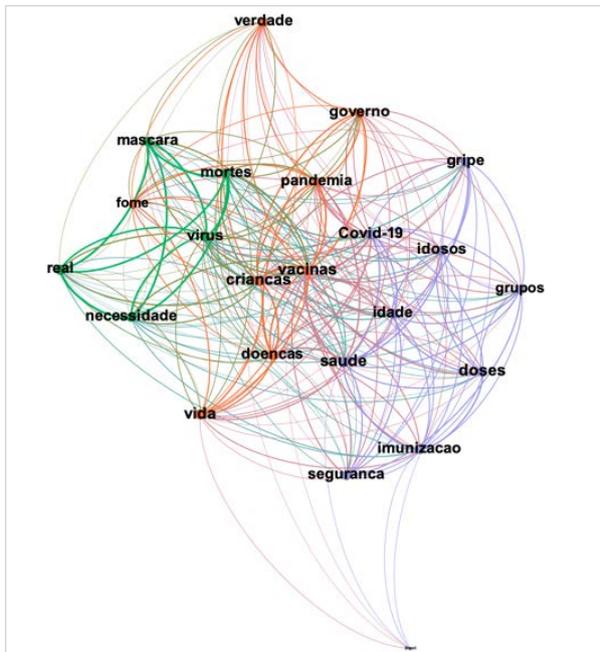


Figure 8 – Data from 2021: Cluster 2 (anti-vaccine) discourse
Source: Own data.

The 2022 data (Figure 9) show an intensification of the polarization and once again an increase in anti-vaccine discourse. Not only is there more sharing of related content, especially with regard to the release of vaccines for children, but there are also more accounts involved in this discussion: almost 20,000 nodes and over than 30,000 content items shared. There is also a concentration of political influencers in the anti-vaccine discourse and a change in the pro-vaccine group, which now incorporates science communication and other traditional media.

In the pro-vaccine cluster (red – Figure 10), there is a much greater change of strategies than seen in previous years (WODAK, 2005). The anti-vaccine actors are named (denial/deniers) and President Jair Bolsonaro is named as a lynchpin in this process of disinformation (fake news). Predication also increases, qualifying vaccines as “safe” and a “right” of children, in addition to the “mandatory” nature of vaccination in Brazil, expanding the argument as a central strategy. This argument seems centered on a discourse designed to counter the disinformation underpinning much of the anti-vaccine discourse, which also frames this discourse politically. The pro-vaccine discourse is also intensified by arguments against denialism.

In the anti-vaccine cluster (blue – in Figure 11) we see the appearance of the nomination of vaccines for other diseases (e.g., polio, measles, yellow fever) and including them in this discourse. In addition, the predication is more impactful, associating vaccines with individual decision-making and individual freedoms and questioning their safety. They are framed as “experimental” and supposedly causing harm (heart failure, heart disease, and death), broadening the argument against mandatory child vaccination and for the need to defend children – a point identified by Barbieri, Christian and Aith (2017) and Coast (2022).

Thus, although this debate is primarily centered around the covid-19 vaccine, these same strategies are being used to discredit and cast doubt on other vaccines in the immunization schedule for children, framing them in political and conspiratorial terms and propagating disinformation. These elements seem to be a consequence of the intensification of the anti-vaccine discourse, perhaps due to the debates about the vaccination of children against covid-19. The following examples show a few of the posts with this type of content.

Mom or Pop, did you read what Anvisa [the Brazilian health regulatory agency] approved for our kids? Did you read what the manufacturer Pfizer says about the vaccine they intend to use on children? To help each father and mother about vaccinating their children, I chose the piece of information that most caught my attention in the Public Hearing held by the Min. of Health. Vaccines for children should be accessible to everyone. They can NEVER be mandatory for anyone. Where there is risk, there must be information, and there must be choice! May God grant our authorities equilibrium and wisdom.

Vaccines in children and their adverse effects: palpitations, chest pains, shortness of breath... THE VACCINE ISN'T MANDATORY [...].

An 8-year-old child is hospitalized in the ICU (Intensive Care Unit) of a private hospital in the municipality of Botucatu with a suspected stroke. As the first symptoms began to appear 11 days after they were vaccinated against COVID-19, our health team followed the established protocols and notified the state government [...]. (Retrieved from Facebook group, 2022)

A high volume of intersections between this anti-vaccine discourse and elements of disinformation and conspiracy theories were also encountered (BERTIN; NERA; DELOUVÉE, 2020; KATA, 2012), as in the following examples:

I HAVE THE ACCOUNT OF THE FATHER OF THE CHILD WHO HAD A HEART ATTACK AFTER BEING VACCINATED IN AN AUDIO MESSAGE, WHATSAPP GROUP LINK IN THE COMMENTS.

A study by Pfizer suggests that the COVID-19 vaccine is to blame for the huge increase in hepatitis among children, while the UK government is launching an urgent investigation [...]. (Retrieved from Facebook group, 2022)

These examples, which propagate conspiracy theories and disinformation about potential harm and problems associated with the covid-19 vaccines for children, start to encompass other vaccines, with the increasingly strong anti-vaccine discourse spreading to other named vaccines.

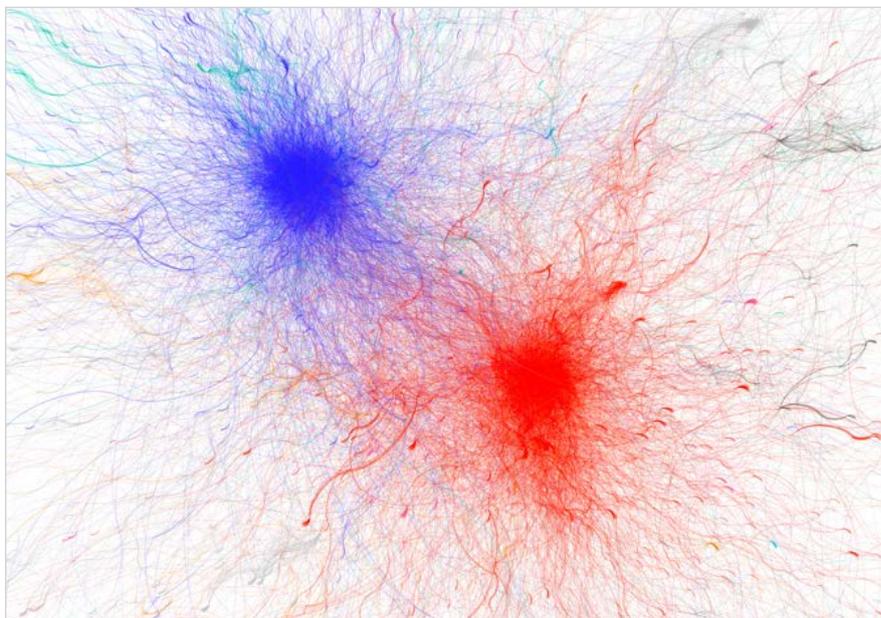


Figure 9 – Data from 2022. Main influencers: Cluster 1 (red) – left-leaning groups, left-wing and pro-Lula parties, and traditional and science communication media; Cluster 2 (red) – pro-Bolsonaro pages and supporters of his government

Source: own data.

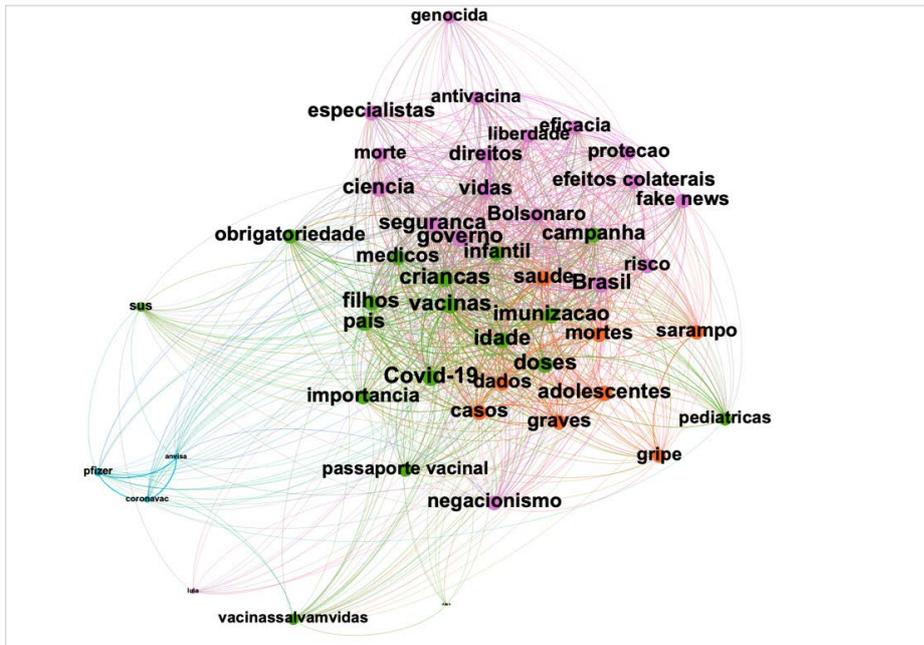


Figure 10 – Data from 2022. Cluster 1 (pro-vaccine) discourse
Source: own data.

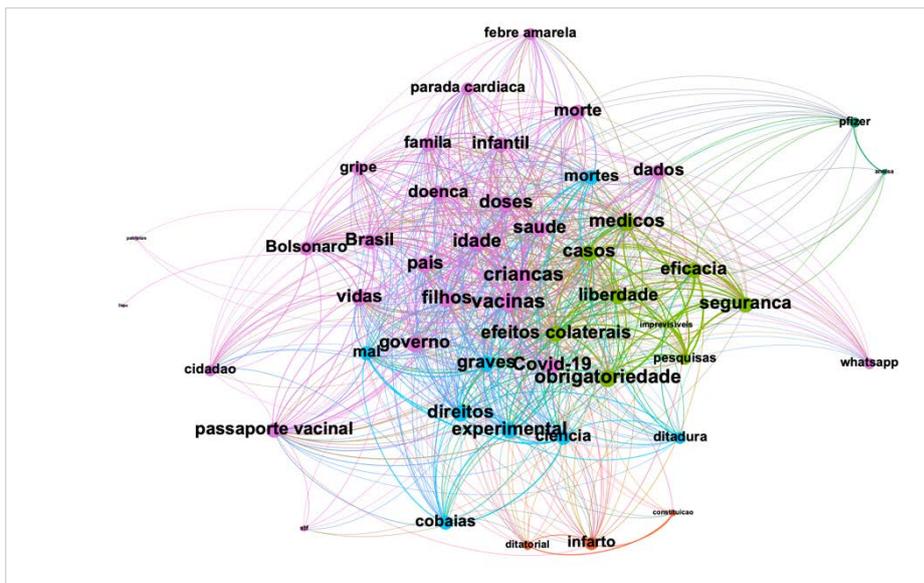


Figure 11 – Data from 2022. Cluster 2 (anti-vaccine) discourse
Source: own data.

As we have seen in the data, the anti-vaccine discourse seems to draw on a few major categories that have been developed and consolidated over the years. Even before the covid-19 pandemic there is already a slight presence of this discourse in public spheres. In terms of activity, vaccination campaigns predominate, with posts shared by institutional actors like local authorities and health agencies. However, from 2020 on, this begins to change. With the pandemic, the anti-vaccine discourse begins to appear and be replicated in Facebook groups and public pages, always separately from and contrary to the pages on which pro-vaccine discourse circulates, as the network analysis shows. These two groups intensify both in the sharing of content and in their clustering or separation from each other, indicating a possible echo chamber effect (RECUERO; SOARES, 2020). This suggests not only an intensification of the debate, but also a closing in

of the discourse, meaning that pro-vaccine discourse does not penetrate the groups where anti-vaccine discourse circulates.

In addition, when we observe the actors involved, the anti-vaccine discourse not only becomes more forceful in public and open groups, but it also begins to be propagated by actors related to religious and political groups, especially groups associated with President Jair Bolsonaro. Meanwhile, pro-vaccine discourse becomes more frequent in news, scientific, and progressive fields. This context can also be associated with the discrediting of covid-19 vaccines, repeatedly attacked by the president, the debate about which permeates social media (RECUERO; STUMPF, 2021). This also suggests that religious and political interdiscourse takes on an important role in the legitimation of the anti-vaccine discourse (CAMARGO, 2022; ULLAH *et al.*, 2021). Another important feature is the conspiratorial bias, which relates vaccines to the covid-19 pandemic and the influence of China (BERTIN; NERA; DELOUVÉE, 2020).

In these cases, the importance of discursive strategies became clear (WODAK, 2015). The nomination of politicians, God and conspiracy theories like “New World Order” and “Bill Gates and vaccines in Africa” are reproduced in order to lend an appearance of truth (argumentation), associated with a negative predication of vaccines and vaccination campaigns. Likewise, the nomination of the side effects and specific cases of death, within the spectrum of disinformation, fosters mistrust and fear, again naming, predicating, and presenting arguments in anti-vaccine narratives.

Another fundamental point is the nomination of other diseases for which there are vaccines, such as flu, polio, yellow fever, etc., in conjunction with the anti-vaccine discourse. This nomination associates these other vaccines with the predications and arguments used to discuss the covid-19 vaccines. Finally, this discourse was found to be significantly intensified after the beginning of the pandemic, impacting these connections.

At the same time, the pro-vaccine discourse is also impacted by the pandemic. While initially its strategies (WODAK, 2015) focus only on the nomination of campaigns and the diseases preventable by vaccination, as the years progress it comes to employ the predication of vaccines as safe and tested and to employ arguments about anti-vaccine statements. In other words, pro-vaccine discourse is modified, and begins to name the political and denialist anti-vaccine discourse and to question and discuss the narratives developed in these pages, as well as the political and conspiratorial framing. There is also an intensification of this discourse as the covid-19 pandemic progresses.

Anti-childhood vaccination narratives

The analysis and discussion presented above about the strategies used to strengthen and amplify anti-vaccine discourse serves as a basis for an explanation of some fundamental points related to the growth of this discourse in the public space of social media platforms and in narrative building.

One important point is the growth of anti-vaccine discourse seen in public spaces on Facebook. This publicization is a new phenomenon, because it shows that the debate has reached more people and become normalized as a discourse. In other words, it demonstrates that the sharing of this type of discourse is authorized, either by the authorities that reproduce it or by the context of debate and conspiracy theories that permeated the covid-19 pandemic. It was a scenario that seems, overall, to have been propitious for the growth of anti-vaccine narratives. In addition, the most widely used discursive strategies focus on the framing of anti-vaccine discourse, with the main objective of delegitimizing vaccination as a strategy to fight diseases in the context of a pandemic. Based on this, it was possible to identify the main strategies employed in the anti-vaccine discourse and how its discursive strategies (WODAK, 2015) operated to frame and legitimize this movement (Table 4).

Table 4 – Anti-vaccine narratives and anti-vaccination discursive strategies

Narrative	Nomination	Predication	Argumentation	Framing	Intensification
Questioning of mandatory childhood vaccination	Rights, freedom, Bolsonaro, government, vaccination passport	Problem	Criticism of mandatory nature	Political discourse	As of 2021
Side effects of childhood vaccines	Guinea pigs, side effects, heart attack, heart problems, government	Serious	Vaccines have side effects that the industry hides	Disinformation and conspiracy theories Political and religious discourse	As of 2020
Questioning the safety and efficacy of vaccines	Experimental vaccine, lack of data, fake science, conspiracies, hunger, God	Absurd, criminal, garbage	Vaccines are experimental and children don't need them	Disinformation and conspiracy theories Political and religious discourse	As of 2020
Overflow of discourse to other vaccines such as flu, measles, yellow fever and polio	Conspiracies associated with the vaccine discourse	Experimental, testing	Vaccines are experimental, the effects of which are hidden by industry and governments	Disinformation and conspiracy theories	As of 2021

Source: own data.

Within this framework, the discursive strategies (WODAK, 2015) of nomination and predication have the effect of connecting vaccines, personalities, and religious elements as negative. Meanwhile, the general framing and nomination strategies are above all fundamental in associating political figures, elements of religious discourse, conspiracy theories and disinformation with the legitimation of anti-vaccine arguments.

Although some of these narratives have been reported elsewhere (AMARAL *et al.*, 2022), the nomination of other vaccines in the context of anti-vaccine discourse is what potentially indicates an overflow of the conspiratorial and political framing of the covid-19 vaccine (especially the vaccine for children) to also delegitimize other vaccines that have historically been accepted in Brazil.

These data therefore indicate that the contradictory context generated around childhood covid-19 vaccination could have opened a space that was propitious for the propagation of anti-childhood vaccination discourse in general, which is in line with the downward trend in childhood vaccination coverage in the country. One example is the criticism of the mandatory nature of childhood vaccination, initially focused on the covid-19 vaccine for children (which is not mandatory) and then spreading to other vaccines.

Moreover, the strong political polarization of the fight against the pandemic, especially around President Jair Bolsonaro and with the clear involvement of political agents, seems to have reduced the entire debate on childhood vaccination to two major groups: one in favor of childhood vaccination, viewing it as a scientific and health issue, and one in favor of the president and, supposedly, individual freedoms, opposing childhood vaccination. This reduction of the debate also highlights a new proximity between groups ideologically aligned with the international far right, with the importing of old conspiracy theories and arguments voiced against other vaccination campaigns, such as polio and measles (AMARAL *et al.*, 2022; COAST, 2022).

In the pro-vaccine discourse (Table 5), a significant change in narrative can be seen from the straightforward reproduction of vaccination campaigns to discussions and debates on the safety and reliability of vaccines, as well as children's right to be vaccinated. In these cases, the most important

strategies (WODAK, 2015) are also those of nomination (mainly of agents propagating anti-vaccine content), predication, and argumentation (vaccines are safe and effective). The intensification and the change in the framing of this discourse seem to have been prompted directly by the publicization and growth of the anti-vaccine discourse.

Table 5 – Anti-vaccine narratives and pro-vaccination discursive strategies

Narrative	Nomination	Predication	Argumentation	Framing	Intensification
Vaccination campaigns	Vaccines and diseases such as polio, measles, mumps, etc.	Immunization	Vaccinating is important	-	-
Vaccines are safe and effective	Immunization, at-risk populations, campaigns	Immunization	Vaccinating is important	-	As of 2020
Denialism, anti-vaccine	Denialists, fake news, science, data, politicians	Absurd	Not vaccinating is denialism	Vaccines are safe and scientifically proven	As of 2021
Children are entitled to be vaccinated	Law, obligation, school	Necessary	Vaccines are children's right	Not vaccinating is denialism	As of 2021

Source: Own data.

CONCLUSIONS

This study aimed to analyze how the covid-19 anti-vaccine discourse impacted the general discourse on childhood vaccination in social media platforms. For this, we analyzed the evolution of discourse concerning childhood vaccination between 2019 and 2022 on Facebook (Meta). We found that the debate on covid-19 vaccination resulted in a significant increase in the volume of content on childhood vaccination in general, rising from 14,707 posts in 2019 to 180,420 posts in 2022 – an over tenfold increase – at a time when children were already receiving the covid-19 vaccine in the country. This increase was accompanied by an intensification of the anti-vaccine discourse and a polarization of the clusters into what could be echo chambers.

In 2019, at the beginning of the analysis period, the debate on childhood vaccination consisted basically of institutional publications on vaccination campaigns underway in Brazil. By 2022, anti-vaccine activists had occupied a large space in the debate, which in turn stimulated the complexification of the pro-vaccine discourse. Anti-vaccine discourse is intersected by disinformation and conspiracy theories about the effects, safety, and interests behind childhood vaccination. There is also intersectionality with religious and political discourses (particularly centered on President Jair Bolsonaro), as well as conspiracy theories and disinformation.

These data show that social media platforms like Facebook seem to reflect an increase in the legitimization of discourse against childhood vaccination, mainly because of the debates raised about the covid-19 vaccine for children. In this context, the political framing of the discussion on the handling of the pandemic, as observed in Brazil, seems to have provided a favorable context for the anti-vaccine discourse and its strategies to expand and spill over to other vaccines with an established track record in the Brazilian immunization calendar.

In addition, there is a clear intensification of the discussion, with a polarization between the anti- and pro-vaccine groups. The latter endeavored to bolster the publicity of the vaccination campaigns and provide

space for debate on denialism and disinformation in the context of vaccination, possibly spurred to do so by the former, whose endeavors to discredit vaccines intensified. The echo chamber effect also indicates the difficulty of circulating different discourses in these spaces. Discursive strategies involving the nomination of vaccines, politicians, conspiracy theories, predication, and argumentation around non-vaccination seem central elements for framing and legitimizing the anti-vaccine discourse. As of 2021, the pro-vaccine discourse shows evidence of adopting these same strategies.

This discussion draws attention to the amplification of discourses contesting the vaccination of children in Brazil, especially in more public spaces (such as pages and groups that can be accessed by anyone), which implies that questioning vaccination has gained legitimacy and authority in the country. At the same time, the pro-vaccine discourse seems to be ineffective in penetrating and countering disinformation and conspiracy theories associated with this anti-vaccination trend. The current context also draws attention to the need for standardized information policies on vaccination and challenging disinformation. Finally, the analysis conducted in this research revealed that the spread of the anti-vaccine discourse to the debate on childhood vaccination in the country coincided with a significant drop in vaccination coverage, a worrying phenomenon that health professionals and researchers have noted in the recent past.

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