Fake news knowledge profile in Brazil during the COVID-19 pandemic

Perfil do conhecimento sobre fake news no Brasil durante a pandemia da COVID-19

Perfil de conocimiento de noticias falsas en Brasil durante la pandemia de COVID-19

Mariana Gomes Leitão de Araújo
ORCID: https://orcid.org/0000-0001-8595-9488
Centro Universitário Euro-Americano, Brasil
E-mail: mgaaraujo.12@gmail.com

Esther Gomes Muniz Rocha
ORCID: https://orcid.org/0000-0001-7546-318X
Centro Universitário Euro-Americano, Brasil
E-mail: munizrochaunieuro@gmail.com

Josué Miguel de Oliveira
ORCID: https://orcid.org/0000-0003-3263-1387
Universidade de Brasília, Brasil
E-mail: josuemoliv@gmail.com

Kelly Cristina Pereira de Araújo
ORCID: https://orcid.org/0000-0002-3158-7129
Centro Universitário Euro-Americano, Brasil
E-mail: kellyaraujo.cp@outlook.com

Mariana Rodrigues Sandes da Silva
ORCID: https://orcid.org/0000-0003-3426-3805
Centro Universitário Euro-Americano, Brasil
E-mail: marianasandes.109@gmail.com

Nathália Lima de Pontes
ORCID: https://orcid.org/0000-0002-0377-6467
Centro Universitário Euro-Americano, Brasil
E-mail: nathaliapontes22@gmail.com

Thais Ranielle Souza de Oliveira
ORCID: https://orcid.org/0000-0003-1135-7729
Centro Universitário Euro-Americano, Brasil
E-mail: thaisranielle@gmail.com

Daniel Fernandes Barbosa
ORCID: https://orcid.org/0000-0002-8251-0105
Centro Universitário Euro-Americano, Brasil
E-mail: danielferbarbosa@gmail.com

Pedro Cardoso Alves
ORCID: https://orcid.org/0000-0003-2223-3270
Universidade de Brasília, Brasil
E-mail: pedro.cardoso1989@gmail.com

Jéssica Caroline da Silva e Santos
ORCID: https://orcid.org/0000-0001-5125-2062
Centro Universitário Euro-Americano, Brasil
E-mail: caroline.jessica@outlook.com.br

Tarciana Cecilia Cavalcanti Carneiro Leão
ORCID: https://orcid.org/0000-0002-5097-1492
Centro Universitário Euro-Americano, Brasil
E-mail: tarcianacecilia@gmail.com

Abstract
During the COVID-19 pandemic, a lot of false information spread through social networks, reaching different community groups, and contributing to the failure in the prevention and correct treatment of the disease. This study aimed to outline the profile of people who received fake news related to health during the SARS-CoV-2 pandemic in 2020. This is a descriptive study with a quantitative approach carried out by health academics through a self-administered questionnaire made on Google Forms. A sample of 501 participants was obtained to analyze the participant sociodemographic profile, the content, and the most used ways of receiving fake news. The results indicate that the most received content by the participants was about health, followed by politics. According to the study, traditional communication media are the most reliable source in the search for information among participants, while WhatsApp and Facebook were cited as the most used social media in the dissemination of fake news, with the least reliable news. There is a need for further studies on this topic, to demonstrate which sociodemographic factors, influence the sharing of fake news.
Keywords: COVID-19; Social media; Health care; Fake news; Pandemic.

Resumo

Na pandemia da COVID-19, muitas informações falsas se espalharam pelas redes sociais, atingindo diferentes camadas populacionais e contribuindo para a falha na prevenção e no tratamento correto da doença. Este estudo teve como objetivo traçar o perfil de recebimento de fake news relacionadas à saúde durante a pandemia do SARS-CoV-2 em 2020. Trata-se de uma pesquisa do tipo descritivo de abordagem quantitativa, realizada por acadêmicos de saúde através de um questionário autoaplicável por meio do Google Forms, onde foram obtidas amostras de 501 participantes, podendo analisar o perfil sociodemográfico deles, o conteúdo das fake news e o meio mais utilizado em sua dissipação. Resultados indicam que o conteúdo mais recebido pelos participantes fora sobre saúde, seguido por política. Entre os meios de comunicação, as mídias tradicionais apresentaram maior confiança na busca de informações entre os respondentes. Enquanto o WhatsApp e o Facebook foram relatados como os maiores meios de recepção de fake news, sendo os menos confiáveis em relação às notícias ali presentes. Percebeu-se a necessidade de um aprofundamento nas investigações desta temática, para demonstrar que fatores sociodemográficos podem influenciar o compartilhamento de fake news.

Palavras-chave: COVID-19; Mídias sociais; Assistência à saúde; Fake news; Pandemia.

Resumen

En la pandemia de COVID-19, falsas noticias han salido en las redes y llegado a la gente con un fallo en la prevención y en el tratamiento correcto. Este estudio ha tenido como objetivo perfilar el recibimiento de las falsas noticias relacionadas con la salud durante la pandemia del SARS-CoV-2 en 2020. De eso se trata, una pesquisa descriptiva de abordaje cuantitativa, realizada por académicos de la salud a través de formularios de Google, de donde se tomó una muestra de 501 aspirantes, donde se han podido analizar el perfil socio demográfico de los mismos, el contenido de las noticias falsas y los medios de disipación más utilizados. Los resultados indican que el contenido más recibido por los aspirantes han sido sobre la salud, seguido por la política. Entre los medios de comunicación tradicional se presentan más grande confianza por la busca de información entres los encuestados. Mientras WhatsApp y Facebook son relatados como unos de los más grandes medios de recepción de noticias falsas, siendo los mismos menos confiables en relación con las noticias allí presentes. Notase la necesidad de una investigación más profunda sobre este tema, para que sea posible la demostrará que los factores socio demográfico puede influencia el compartir las falsas noticias.

Palabras clave: COVID-19; Medios de comunicación sociales; Atención a la salud; Noticias falsas; Pandemia.

1. Introduction

With the technological evolution in recent years and the intensification of information exchange, social networks have become fertile ground for the propagation of unreliable information without scientific rigor. With the SARS-CoV-2 pandemic, the health area was of broad interest to all relevant media, whether its contents were true or not. In a study conducted by Waisbord (2020), it was shown that knowledge about health was previously almost exclusively the domain of doctors, but now anyone with a smartphone can make use of Instagram and WhatsApp to create and share information without any limits. The evolution of communication and ease of access have implications not only on the online environment, but also on global reality (De Souza Júnior, Raasch, Soares & Souza, 2020).

In this same context, it is easy to use these media for various dialogues or sharing information and content from unreliable sources. This information is called "fake news"; in English, the term fake news was created in 1930, defined as lies designed to deceive the public, containing significant omissions or distortions. This phenomenon is not new, since adulterated facts and invented information are part of the history of certain Western powers (Dentith, 2017).

In Brazil, although the term fake news is widely used, it has not yet been formally included in the Portuguese language lexicon, being, therefore, a foreign term. However, it has been socially accepted by the population and has gained relevance worldwide since the recent 2016 US elections (Porcello & Brites, 2018), in which three of the five most shared pieces of information on Facebook were false, according to the Public Policy Research Group on Access to Information of the University of São Paulo (USP). Fake news has found fertile ground on social networks given the way links are shared, hindering the recognition of the content in flux and making it difficult to identify the informational sources that support it (Delmazo & Valente, 2018).

To combat fake news, the Ministry of Health (MOH) created a webpage "Health without fake news" to verify the

authenticity of the information circulated in social networks, as well as to inform the population about probable sensationalist lies. From this institutional program, it was possible to observe throughout the analysis that the Ministry of Health, as the official voice of the government, contested the truth content of fake news, appealing to medical knowledge and scientific evidence, which are omitted or misrepresented in the scope of the fake news. In doing so, the agency not only clarifies the risks of consuming such information thoughtlessly, but also exercises a pedagogical position to instruct the population about health care, based on credible and authorized information (Silva & Silva Júnior, 2019).

In the health area, one of the great promoters of fake news became known as the anti-vaccine movement. A study published in the Lancet scientific journal in 1998, by British researcher Andrew Wakefield, claimed that the MMR vaccine was associated with the development of autism in children, which was later identified as fraudulent. After this event, the magazine retracted its statement, but the information had already been disseminated and many parents stopped vaccinating their children. Thus, despite the awareness campaigns conducted by public agencies, the movement continued to become more popular over the years (Saraiva & De Faria, 2019).

The antivaccine movement was included in the World Health Organization (WHO) report as one of the ten greatest risks to global health, characterized by the action of groups of people in social networks that promote distrust in the efficiency and safety of vaccination (Hotez, 2019). The proportion of the movement was so large that it triggered the reappearance of diseases that had already been eradicated, with new reported cases of tetanus in Europe and measles in the United States and Brazil (Beltrão et al., 2020). According to data released by the Ministry of Health, between the years 2015 and 2016, Brazil had the worst vaccination rate of the last 12 years, as it vaccinated only 86% of the population; the vaccination coverage recommendation of the WHO is 95% (Saraiva & De Faria, 2019).

Thus, there is a need to deepen investigations and fight against fake news, and legal restrictions should be developed to combat misinformation, without affecting the freedom of expression (Delmazo & Valente, 2018). At crucial moments, i.e., emergency health situations such as outbreaks, epidemics, and pandemics, reliable and accurate communication is of paramount importance, since this allows the responsible bodies to adopt effective measures (De Souza Júnior, Raasch, Soares & Souza, 2020).

Currently, the world is aware of the situation and the spread of the new coronavirus, recognized as SARS-CoV-2 by the WHO, a severe acute respiratory syndrome causing COVID-19 (De Souza Júnior, Raasch, Soares & Souza, 2020). At this moment, according to WHO, 167,011,807 cases have been confirmed in the world, resulting in a total of 3,472,068 deaths. In Brazil, 21,611,552 confirmed cases and 602,201 deaths have been recorded (as of October 14, 2021).

In the influenza pandemic that occurred between the years 2009 and 2010, measures were adopted that are being used to combat the pandemic, such as the adoption of communication campaigns in social media for greater population awareness and the issuance of daily bulletins on the epidemiological situation to reassure the public (Marcial Lima et al., 2015). Health education was seen as one of the main efforts for the con& Souza, 2020). Therefore, the effort to effectively confront the disease and related fake news is the sum of the dedication of various spheres, such as political, media and social, in addition to the coordinated multi-professional work of various areas of health.

In this context, there is a need for actions that involve communication strategies to stop the production of false news, as well as the need for social networks to develop ways to inhibit the spread of this information on a large scale. To collaborate with these efforts, the objective of this study was to trace the sociodemographic profile of the reception of fake news related to health during the COVID-19 pandemic in the year 2020.

2. Methodology

This was a descriptive study with a quantitative approach conducted by health academics. The descriptive study

sought to identify, expose, and describe characteristics of a specific population, events, and phenomena of a given reality. The collection instrument was an online self-administered questionnaire on the Google Forms platform containing 37 items, including sociodemographic, attitudinal, and behavioral questions, prepared by the authors themselves following the references of Pasquali (1997) and Bandeira; Marques and Viega (2000).

A sample of 501 participants was obtained, via convenience sampling, consisting of selecting a population that was accessible, and allowing dissemination to the entire country to obtain the largest number of responses. Since this was a national survey, the collection of information was conducted between 04/01/2020 and 05/31/2020, through the social networks of the collaborators of the study and having as a criterion for participation being over the age of 18 years. The participation of individuals occurred voluntarily, with informed consent and ensuring the reliability of data and any personal information.

The sociodemographic variables analyzed were gender, education, income, and marital status. The response options were multiple choice, and the order of the items was randomized and aimed to obtain information. Data are described as absolute (n) and percentage (%) distributions, represented by the mean. The analysis was performed in the free program R, with the significance level set at 5% for the repeated measures test to verify the confidence levels of the different media. Two-tailed chi-squared tests were conducted to verify the categorical variables and the receipt of fake news by media. The confidence interval at 95% was used to analyze the confidence attributed to the media. To compare the degree of confidence attributed to the media, a repeated measures ANOVA was used, followed by the Bonferroni post hoc test. For all tests, an alpha of 0.05 was adopted.

3. Results and Discussion

Fake news content

The study sample was composed of a total of 501 participants, including 348 (women) and 153 (men) who frequently use social media. It can be noted that the most prevalent subject of the identified fake news was about politics, health, diseases, and vaccines. It was noted that, with the SARS-CoV-2 pandemic, people sought refuge on the Internet and social media, potentiating vehicles of misinformation and rapid sharing of fake news (Atehortua & Patino, 2021). Other studies have demonstrated similarity in the most prevalent subjects of fake news by identifying a direct relationship with health (Ahmad, 2020; Galhardi, Freire, Minayo & Fagundes, 2020).

It was noted that, in the context of fake news dissemination, politics also stands out as an area of great dissemination. Major political events such as elections were important embryos for the evolution of fake news propagation. A recent study demonstrated that certain political activists manipulatively use quotes from opinion leaders and media vehicles to obtain credibility in the created fake news and in its possible dissemination (Recuero & Gruzd, 2019). This practice was also registered in the news disseminated during the pandemic (Linder, Roozenbeek, & Compton, 2020). Between 2016, with the US elections, and 2018, with the Brazilian elections, WhatsApp was consolidated as a means of communication for the efficient dissemination of fake news (Baptista, Rossini, Oliveira & Stomer-Gallery, 2019). This same application gained similar prominence in the current COVID-19 pandemic (Pinheiro et al., 2020).

Regarding women (n=348), it was possible to show that the predominant content in the received fake news was related to politics with 90.2% (n=321), 80.5% (n=280) to general health, 70.1% (n=244) to diseases, and 48.3% (n=168) to vaccines (Table 1). Despite the smaller sample size, a similar result was found among men (n=153) (Table 1). Politics and health are themes of great relevance in social discussions, and in recent years have been a major target of fake news. In a scenario of political fragility and pandemic evolution, this combination can generate serious consequences. Social networks have become means where people have quick access to information and during an outbreak, and they are also used to obtain information about COVID-19 (Xavier, Olenscki, Acosta, Sallum & Saraiva, 2020). However, with the SARS-CoV-2

pandemic, the fake news intensified sharply; thus, the fake news related to health led to considerable misinformation and increased the potential risk of harming the population (Ferreira, Lima & Souza, 2021).

Table 1 - Types of fake news contents according to sex, Brazil, 2020.

Content of the Fake News	Sex			
	F		M	
	N	%	N	%
Health	280	80.5	117	76.5
Politics	321	92.2	138	90.2
Diseases	244	70.1	102	66.7
Vaccines	168	48.3	66	43.1
Other	17	4.9	12	7.8

Source: Authors (2020).

Regarding education, it was observed that, for participants with an elementary education (n=9), there was a predominance of fake news directed to general health (77.8%), diseases (66.7%), vaccines (44.4%), and politics (55.6%) (Table 2). For participants with a high school education (n=196), the highest receipt of fake news was identified as politics (90.8%), general health (74%), diseases (68.4%), and vaccines (42.3%) (Table 2). Participants with higher education (n=296) were similar to those with a high school education, with the highest receipt of fake news about politics (93.2%), general health (82.8%), diseases (69.6%), and vaccines (49.7%) (Table 2). In a study conducted by Pinheiro et al. (2020), it was observed that, in the scope of fake news contents, the health theme was the most recurrent, with a prevalence of about 77%. It was noted that, during the coronavirus pandemic, subjects related to health and politics obtained great notoriety, and were efficient vehicles of dissemination regardless of education level. It was also found that the negative impact of false news increased levels of distrust in students, especially when coming from social networks, demonstrating that education is the best way to combat fake news disinformation (Morais & Sobral, 2020).

Table 2 - Types of fake news content in relation to education: elementary school (ES), high school (HS,) and higher education (HE). Brazil, 2020.

Content of the fake news	Education					
	ES		HS		HE	
	N	%	N	%	N	%
Health	7	77.8	145	74	245	82.8
Politics	5	55.6	178	90.8	276	93.2
Diseases	6	66.7	134	68.4	206	69.6
Vaccines	4	44.4	83	42.3	147	49.7
Other	0	0	7	3.6	22	7.4

Source: Authors (2020).

When assessing the family income, it was noted that participants with up to two times the minimum wage (n=138)

received more fake news content, focused on general health (76.1%), diseases (65.2%), vaccines (44.9%), and political content (90.6%) (Table 3). Among participants who received from two to five times the minimum wage (n=130), most discussions were about health in general (80.8%), diseases (66.9%), vaccines (50%), and politics (92.3%) (Table 3). Among participants who earned between five and ten times the minimum wage (n=82), the contents were focused on politics (92.7%), health in general (78%), diseases (70.7%) and (46.3%) vaccines. For the group of respondents earning more than ten times the minimum wage (n=37), it was observed that discussions focused on politics (97.3%), health in general (75.7%), diseases (70.3%), and vaccines (48.6%) (Table 3). It was observed that the most received content by the participants was about health and the political context. Fake news when focused on health demonstrated a negative impact by interfering with effective communication, which contributed to social unrest during the SARS-CoV-2 pandemic (Moscadelli et al., 2021). Thus, it was found that when the fake news presented beneficial characteristics to health, they tended to be more disseminated because they were manipulated to present beneficial characteristics and strengthen the culture of caring for others (Monari & Bertolli Filho, 2019). Thus, fake news has negative impacts that allow people to faithfully trust in false content and disbelieve scientifically proven information (O'Connor & Murphy, 2020).

**Table 3 -** Types of fake news content in relation to family income. Brazil, 2020.

Content of the Fake News	Family Income									
	Did not answer		Up to two times the minimum wage		Between two and five times the minimum wage		Between five and ten times the minimum wage		More than ten times the minimum wage	
	N	%	N	%	N	%	N	%	N	%
Health	95	83.3	105	76.1	105	80.8	64	78	28	75.7
Politics	102	89.5	125	90.6	120	92.3	76	92.7	36	97.3
Diseases	85	74.6	90	65.2	87	66.9	58	70.7	26	70.3
Vaccines	51	44.7	62	44.9	65	50	38	46.3	19	48.6
Other	8	7	8	5.8	3	2.3	6	7.3	4	10.8

Source: Authors (2020).

Main social media and dissemination of fake news in relation to variables such as sex, education, and marital status

The confidence intervals for the mean scores given by the participants regarding the reliability of the media were 2.99 (95%CI [3.04, 2.94]) for print newspapers, 2.95 (95%CI [3,01, 2.90]) for television, 2.90 (95%CI [2.95, 2.85]) for radio, 2.82 (95%CI [2.87, 2.76]) for online newspapers 2.67 (95%CI [2.72, 2.62]) for news portals, and 2.66 (95%CI [2.71, 2.61]) for printed magazines (Figure 1). It was observed that traditional media like television, print newspapers, and radio impart more reliability to the respondents, followed by printed magazines, online newspapers, and news portals. These media have the tradition of checking news and sources, which may explain their reliability, even in the scenario of increasing searches for information on social networks by the population (Bell & Owen, 2017; Eichler, 2018). In contrast, social media and communication apps presented lower reliability. Gardia, Carvalho, Ferreira, Pinto & Sugano (2015) found in their study that social networks such as WhatsApp, Facebook, and YouTube do not provide credibility in disseminating information when compared to cable TV, online newspapers, and broadcast TV.

Figure 1 - Confidence interval (CI 95%) for reliability averages of communication media. Brazil, 2020.
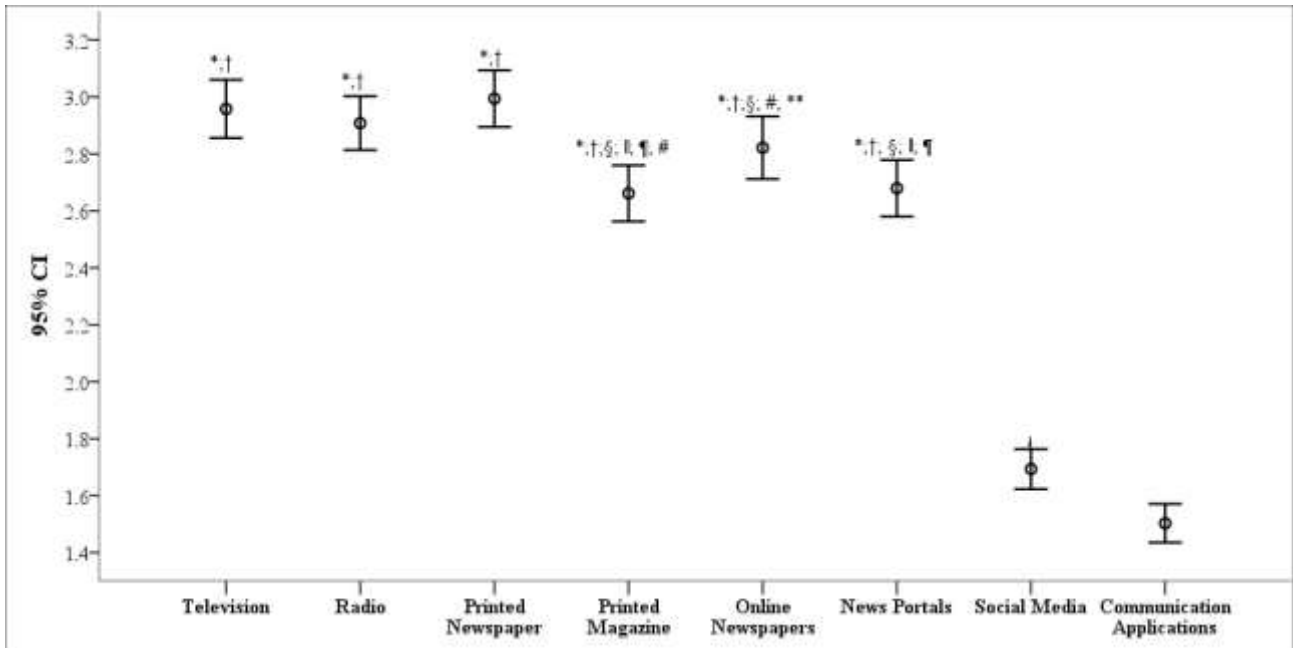
*- $p < 0.001$ in comparison with the medium social media; † - $p < 0.001$ in comparison with the medium communication applications; ‡ - $p < 0.01$ in comparison with the medium communication applications; § - $p < 0.01$ in comparison with the medium television; Ɩ - $p < 0.01$ in comparison with the medium radio; ¶ - $p < 0.01$ in comparison with the medium printed newspapers; # - $p < 0.05$ incomparison with the medium printed newspapers; ** - $p < 0.05$ in comparison with the medium news portals. Source: Authors (2020).

When comparing the degree of trust attributed to media, the repeated measures ANOVA identified significant differences [F (7.492) = 100.52; $p < 0.001$]. Bonferroni's test identified that communication apps (mean=1.50 ± 0.77) were assigned less trust in comparison to social media (mean=1.69 ± 0.80; $p < 0.01$). However, both social media and communication apps were assigned less confidence in comparison to all other media ($p < 0.001$), with the communication apps having the least confidence assigned. Print newspapers (mean=2.99 ± 1.13) was the medium that had the highest level of confidence, showing significant differences with printed magazines (mean=2.66 ± 1.12; $p < 0.01$), news portals (mean=2.68 ± 1.13; $p < 0.01$), and online newspapers (mean=2.82 ± 1.25; $p < 0.05$). Television (mean=2.96 ± 1.16) also had a higher degree of confidence in comparison with printed magazines ($p < 0.01$), news portals ($p < 0.01$), and online newspapers ($p < 0.01$). Radio (mean=2.91 ± 1.08) had a higher degree of confidence when compared to printed magazines ($p < 0.01$). Online newspapers had a higher degree of confidence when compared to printed magazines ($p < 0.05$). News portals had lower confidence when compared to online newspapers ($p < 0.05$).

As for gender, it was observed that 96.6% of women reported having received fake news on WhatsApp, 66.4% through Facebook, 46.6% on Instagram, 19.5% on Twitter, 15.2% in newspapers and email, and 2.6% via LinkedIn (Figure 2). Despite the smaller sample number, a similar result was found among men (Figure 2). It is important to highlight that female participants tended to show more confidence in fake news (Shu, Wang & Liu, 2018).

Figure 2 - Distribution of the receipt of fake news by social media in relation to gender. Brazil, 2020.
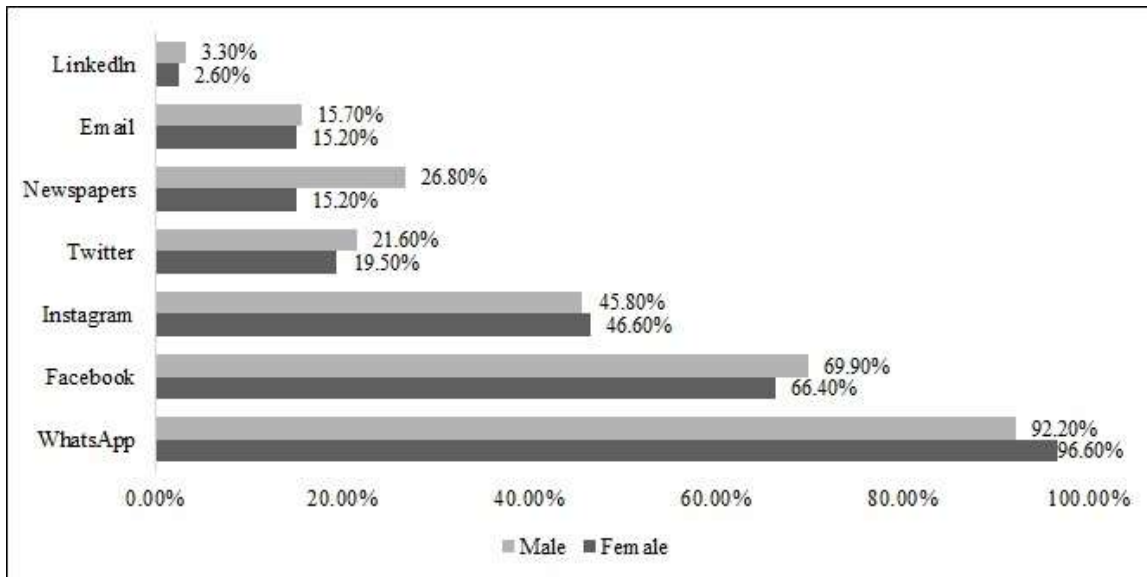
Source: Authors (2020).

Regarding education, it was found that 97.6% of participants with a higher education level reported receiving fake news by WhatsApp, 66.8% by Facebook, and 51.4% via Instagram (Table 4) and in the other social media received less fake news. For the participants with a high school education, the same trend of receiving fake news was observed, with 93.4% received by WhatsApp, 68.9% by Facebook, and 40.8% by Instagram (Table 4). For participants with an elementary school education, it was found that 55.6% received fake news from WhatsApp/Facebook and 22.2% from newspapers (Table 4). Thus, it was noted that participants with a lower academic degree tended to believe fake news more easily, suggesting that a higher educational level can impact on the individual's ability to evaluate and verify the origin of information received (Branco, 2017; Gomes, Penna & Arroio, 2020; Guerreiro, 2018). In a study conducted by Pinheiro et al. (2020), it was observed that 29% of fake news was identified by undergraduate students. Krayse and Colegas (2020) reported that students must be transparent when they do not know or are not sure about certain news, should impose limits, and should not pass on news that may contain false content.

Table 4 - Distribution of the receipt of fake news by social media in relation to education. Brazil, 2020.

Medium of communication	Schooling					
	Elementary		High school		Higher education	
	N	%	N	%	N	%
WhatsApp	5	55.60%	183	93.40%	289	97.60%
Facebook	5	55.60%	135	68.90%	198	66.90%
Instagram	0	0%	80	40.80%	60	51.40%
Twitter	0	0%	41	20.90%	152	20.30%
Newspapers	2	22.20%	56	18.40%	56	18.90%
Email	0	0%	54	11.70%	54	18.20%
Blog	0	0%	19	9.70%	35	11.80%
LinkedIn	1	11.10%	7	3.10%	7	2.40%

Source: Authors (2020).

Regarding marital status, it was observed that single participants received fake news by WhatsApp in 95.6% of cases, 67.4% on Facebook, 52.5% on Instagram, and 25.8% om Twitter (Table 5). Among participants in a stable union or married, 94.2% received fake news by WhatsApp, 66.2% by Facebook, 31.7% by Instagram, and 23% by newspapers (Table 5). Among the divorced/widowed, similar results were noted with 95.2% of the content received by WhatsApp, 76.2% by Facebook, 42.9% by Instagram, and 28.6% by newspapers (Table 5). These results allow us to infer that single people tend to share more news, whether true or false (Martino, 2014). It is possible that these people, through the ease of access to social media and the need to establish new personal relationships, approach new or pre-existing contacts with these adulterated contents. This dynamic facilitates a higher frequency of interactions and information sharing. Lee and Ma (2012), as well as Apuk and Omar (2020), state that the search for information on social media tends to influence the dissemination of fake news by the need for consolidation in interpersonal relationships.

Table 5 - Distribution of the receipt of fake news by social media in relation to marital status. Brazil, 2020.

Communication Media	Marital Status					
	Single		Married/stable union		Divorced/widowed	
	N	%	N	%	N	%
WhatsApp	**326**	95.60%	131	94.20%	20	95.20%
Facebook	**230**	67.40%	92	66.20%	16	76.20%
Instagram	**179**	52.50%	44	31.70%	9	42.90%
Twitter	**88**	25.80%	11	7.90%	2	9.50%
Newspapers	**56**	16.40%	32	23.00%	6	28.60%
Email	**47**	13.80%	23	16.50%	7	33.30%
Blog	**39**	11.40%	2	9.50%	2	9.50%
LinkedIn	**9**	2.60%	3	2.20%	2	9.50%

Source: Authors (2020).

4. Final Considerations

The study presented throughout this article had as the main objective to outline a profile regarding the reception of health-related fake news. The results obtained through the questionnaires made available to the participants were relevant to the achievement of the research objective, as it identified that the sharing of fake news was a recurrent means of spreading misinformation in multiple demographic groups, undermining the credibility of science, and strengthening trust in news sent by social media, even if lacking reliable sources.

The investigation allowed us to recognize that the most relevant contents were health and politics. The results suggest that sociodemographic factors interfere in the sharing of fake news, as women, people with a lower education level, and single people were the groups most susceptible to sharing fake news. The social networks WhatsApp and Facebook stood out as the most common ways of receiving fake news. However, to obtain true news, people still look for traditional media such as television, printed newspapers, radio, printed magazines, online newspapers, and news portals.

We reinforce the need to deepen investigations into this theme, aiming to amplify the understanding about the impact of sociodemographic factors on the consumption and sharing of fake news. In this context, it is worth highlighting the need to expand the capacity to recognize fake news by the population. Therefore, for future studies, it is suggested to assess the ability

of the population to identify fake news, as well as the strategies used to verify this information, to contribute to combating this issue.

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