

*Full Length Research Paper*

# **Social support and positivity: Analyzing user-generated comments on the Instagram pages of two Brazilian cancer hospitals**

**Priscila Biancovilli<sup>1</sup>, Eloy Macchiute de Oliveira<sup>2</sup>, Lilian Thomer<sup>3</sup> and Claudia Jurberg<sup>4\*</sup>**

<sup>1</sup>School of Health Sciences, University of Pécs, Pécs, Hungary.

<sup>2</sup>University of Rio de Janeiro State, Brazil.

<sup>3</sup>University of Haifa, Israel.

<sup>4</sup>Institute of Medical Biochemistry, Federal University of Rio de Janeiro and Oswaldo Cruz Foundation, Brazil.

Received 16 March, 2022; Accepted 17 May, 2022

**Online social media platforms are an important tool for individuals who wish to exchange ideas, stories, feelings, information. Hospitals and public health organizations can use social media platforms, including Instagram, to engage, interact or communicate with patients, family members and anyone interested in health information or new discoveries. The purpose of this study is to understand the main characteristics of user-generated digital narratives on the Instagram pages of two Brazilian cancer hospitals. The study fills a gap in the literature on cancer communication by studying a language other than English in a Latin American context, and examining user-generated comments over a period of more than 6 years. The findings of the authors' content analysis show a preponderance of positive and social support messages, even though cancer is a disease laden with negative stigma. Religiosity, which can strengthen supportive social ties and create a stronger sense of empowerment and control, was also a hallmark of these narratives. In the content analysis of Brazilian cancer hospitals' Instagram accounts, the predominant characteristic of user comments was that of positivity, even though cancer is a disease laden with negative stigma.**

**Key words:** Social media, Instagram, digital narratives, cancer, content analysis.

## **INTRODUCTION**

Online social media platforms are an important tool for individuals who wish to exchange ideas, stories, feelings, and information. Social media usage is one of the most popular online activities. In 2020, an estimated 3.6 billion people were using social media worldwide, a number that is projected to increase to almost 4.41 billion in 2025 (Statista, 2020).

There is a growing use of social media and its extension to health promotion by services and individuals (Dadich and Khan, 2020; Hunt, 2015). Instagram is a mobile social media service for photo and video sharing (Forsey, 2020). On Instagram, users can share their opinions with others by liking or sharing posts or by writing comments underneath original posts (Chun and

\*Corresponding author. E-mail: [cjurberg@bioqmed.ufrr.br](mailto:cjurberg@bioqmed.ufrr.br).

Lee, 2017). Social media content is largely peer generated, and Instagram encourages users to make comments on others' photos, which then remain displayed below the photo for everyone to see (Holland and Tiggemann, 2016; Tiggemann and Barbato, 2018). Moreover, Instagram also facilitates the use of hashtags and mentions (Guidry et al., 2017). Hospitals and public health organizations use social media platforms, including Instagram, to engage, interact or communicate with patients, family members, and anyone interested in health information or new discoveries (Ventola, 2014). Social media has numerous advantages for healthcare, such as providing patient care, education, and organizing health promotion activities (Al Aufa et al., 2020). According to Charalambous (2019):

*“The current era is characterized by the vibrant and rapidly evolving communication technologies. Communication in any form has evolved and now includes media such as Facebook, Twitter, and Instagram to report a few. Communicating and consuming information has shifted from the more traditional ways to new ones as part of this communication evolution. Cancer is an area of healthcare where such social media have been championed either to promote public awareness and drive campaigns or influence political decision-making”.*

There is no doubt that while people use social networks to exchange information on various themes, one of the most actively discussed topics is health (Gill et al., 2013). Studies observed that adults search for health information online and then speak with their primary caregiver about what they have read. Marrapondi (2017) states that:

*“There is an entirely unknown and unseen community seeking health information online beyond our primary users. Unfortunately, much of this information comes from unauthenticated, unreliable sources. This information is oftentimes erroneous or misleading, which can lead to wrong self-diagnosis and ineffectual or damaging treatment attempts by the layperson.”*

Therefore, it is important to understand health information on social media and what kind of public engagement they produce, in order to reflect and propose effective communication against misinformation, wrong diagnosis or erroneous/late treatments. The present study examines users' comments on the Instagram accounts of two Brazilian hospitals dedicated to cancer treatment. The purpose was to understand the main characteristics of digital narratives posted by users, and their motivations for doing so. The authors decided to focus their study on Instagram because this is one of the most widely used social networks in the world, with 1,22 billion active users as of January 2021 (Statista, 2021a).

Brazil has 69 million active users on Instagram, the third largest number of any country in the world (Salles, 2020). Nevertheless, the authors found a lack of studies dedicated to users who publish comments on cancer profiles on this platform. This study fills a gap in the literature on cancer communication by analyzing a language other than English in a Latin American context, and by examining user-generated comments over a period of more than 6 years in a growing social media.

Studies that have documented cancer-related social media posts (Basch and Maclean, 2019a, b) highlighted the strong occurrence of content related to social support, discussions on treatment, and individual stories. However, some studies on the collective imagination in relation to cancer indicate that the population associates the disease with mostly negative feelings or events (Goldenberg and Arndt, 2008; INCA, 2007; Machado et al., 2017; Niederdeppe and Levy, 2007). Other studies also described the common association of cancer with war metaphors, such as a person's "battle" or "fight" against cancer, which may suggest that cancer treatment is always painful, scary and difficult (Grant and Hundley, 2009; Hauser and Schwarz, 2020; Maganã and Matlock, 2018; Sontag, 1991). A Brazilian survey called "Conceptions of Brazilians on Cancer" (INCA, 2007) reveals that 70% of respondents associated cancer with death, pain and suffering. For this reason, the hypothesis of the present study is that the digital narratives of users who comment about cancer on Instagram profiles reflect society's predominant perception about the disease. Our research questions were:

**Q1:** What are the more frequent kinds of narrative amongst users who comment on Brazilian cancer hospital pages?

**Q2:** Regardless of the institutional Instagram account, do users' narratives always follow the same approach?

According to Tifentale and Manovich (2015), Instagram users "construct their identities and simultaneously express their belonging to a certain community. Thus, performing the self is at once a private act as well as a communal and public activity." As Kristensen and Prigge (2018) recognize, "the construction of a 'data self' entails a new conception of lived experience, where the self is known through data, and the data simultaneously inform the self."

## MATERIALS AND METHODS

This exploratory analysis aims to understand the digital narrative of Instagram users on the profiles of two Brazilian hospitals dedicated to cancer treatment: AC Camargo Cancer Center and the Hospital de Amor (in English, Love Hospital). These profiles were chosen over others because they are the most frequently updated among the Brazilian cancer hospitals' profiles that was found. In addition, both hospitals are internationally recognized for excellence in the treatment of cancer patients, diagnosis, teaching, and research on

cancer (A.C. Camargo Cancer Center, 2020; Hospital de Amor, 2020). AC Camargo Cancer Center is located in São Paulo, the largest city of Brazil, with more 20 million inhabitants in the metropolitan area. This hospital was founded in 1953 and provides private and public health care, the latter financed by the Brazilian public health system (the Unified Health System, or SUS). It has the most important private cancer research center in the country (A.C. Camargo Cancer Center, 2020). Hospital de Amor was founded in 1962 and is located in the city of Barretos. It operates exclusively through the SUS, which means that all patients are offered free healthcare (Hospital de Amor, 2020). Both institutions accept donations to finance their activities.

In this study, the authors were especially interested in examining the narratives of users that addressed cancer. To this end, they monitored public engagement of the Instagram profiles of the two institutions. They started their investigation from the first post posted on each of the pages on Instagram and completed the collection of the *corpus* in March 2020. The AC Camargo Cancer Center profile was launched on October 28, 2013 and the Hospital de Amor profile was launched on June 7, 2014. The analysis of users' digital narratives on Instagram was based on the methodology proposed by Laurence Bardin (2011) for psychosociological investigations and for the study of mass communications. For Bardin (2011), pre-analysis means "a period of intuition, in which they seek to systematize the initial ideas that will lead them to a more precise scheme for sequential operations." At this stage, the objectives and questions of the research are defined, and the universe of the study is delineated, including the material that will be examined, the hypotheses, and the indicators that lead to the final interpretation (Bardin, 2011). This universe is called the *corpus*. In the present study, this comprises the comments of users on the Instagram profiles of the aforementioned Brazilian hospitals. As the comments are public and we suppressed their identification, preserving their privacy, there is no need for approval from ethics committees.

The comments posted under all the photos and videos on the two pages were manually captured and saved. The authors' pre-analysis stage included the systematic reading of the *corpus*. Then, two raters separately codified the material after observing its representativeness, looking for homogeneity and relevance. This phase consisted of a transformation of the raw data into categories created to define the digital narratives. The two researchers took charge of viewing the *corpus* and discussing the categories used to classify each unit of content. A word was only considered as part of a category if it appeared at least 20 times. This number seemed ideal because they had to define a cut for this sample, which would make content analysis possible; the authors believe that this cut help them to better organize the categories and thus have a comprehensive overview of the conversations and narratives about cancer on the selected Instagram accounts. With the initial units, the quantitative and qualitative analyses (Minayo and Sanches, 1993) were automated with MAXQDA 2018 (Verbi Software, 2017); a software program designed for qualitative and mixed methods data. After that, the content was interpreted by identifying the presence, frequency of appearance, and meaning of the content units.

Subsequently, the authors looked for the common characteristics of the comments that would help them understand the nature of the users' engagement in terms of the previously established categories. Their aim was to understand the dynamics of public engagement, the types of narratives contained within the comments, and to seek out patterns. Online comments can be used to explore the public's word-of-mouth communication, which refers to comments that publics make about an issue; this plays a significant role in understanding these publics' perception on a topic (Chun and Lee, 2017). With this investigation, the aimed was to collaborate with other professionals dedicated to cancer communication to explore, in a more rational and assertive way, the

use of social media to transmit relevant health information.

Understanding what and how users communicate and what sentiments they express can be useful in the development and management of health communication strategies.

## RESULTS

### Quantitative data

The institutional profiles of AC Camargo Cancer Center and the Hospital de Amor had their own characteristics with regard to the frequency of posts and the different user approaches (Oliveira et al., 2019). AC Camargo Cancer Center has 91,900 followers, follows 80 other institutions (as of October 2021) and publishes 5.6 new posts a week, on average. Hospital de Amor has 182,000 followers, follows 357 other institutions (as of October 2021) and publishes 7.75 new posts a week, on average. On the AC Camargo Cancer Center page, we identified 806 users who made comments in the 747 posts of our sample; on the Hospital de Amor page, 2,469 users made comments in the 2,641 posts of their sample. It is important to mention that comments can be made by any Instagram users, regardless of whether they follow the pages or not. It was observed that 29 out of a total of 3,246 individuals commented on the Instagram pages of both institutions.

Based on 12 categories with 113 selected words (Table 1), 5,069 comments, from the total of 6,793 comments, were categorized because they contained one or more of the 113 words selected: 4,117 on the Hospital de Amor page and 952 on AC Camargo Cancer Center. Of these, 6,536 valid words (after excluding names, emoticons, and profiles) were used to build the narratives. As has been pointed out, the selected words had to appear at least 20 times in both profiles to be included in one of the categories.

It is important to note that the categories "War" and "Negative" had few words in each because other negative words did not achieve the minimum frequency. The authors included them because of their interest in comparing the present analysis with previous studies that have shown the frequent association of cancer with pain, suffering, fatality, and death (Goldenberg and Arndt, 2008; INCA, 2007; Machado et al., 2017; Niederdeppe and Levy, 2007), and the association of cancer with war metaphors (Grant and Hundley, 2009; Hauser and Schwarz, 2020; Maganã and Matlock, 2018; Sontag, 1991).

From this initial categorization, MAXQDA software was used to assist in both quantitative and qualitative analyses. The software performed 8,928 categorizations on 5,069 comments identified with the selected words, representing 75% of all comments. The remaining 25% were not categorized, because as they did not contain words relevant to the study.

Of all comments, it was possible to identify 45 strictly identical paragraphs that made them suspect they were

**Table 1.** Words selected for each of the categories identified on the Instagram pages of the AC Camargo Cancer Center and the Hospital de Amor.

Category	Number of words	Selected words
Acknowledgements	6	thank, grateful, gratitude, thank you (obrigado, for men), thank you (obrigada, for women), thank you (agradeço)
Love	7	loved, love (amo), love (amor), affection, heart, longing, missing
Praise	34	admiration, admire, cool (bacana), beautiful (belo), dedication, exciting, special, excellence, excellent, fan, fantastic, great, human, incredible, cool (legal), beautiful (linda), beautiful (lindas), beautiful (lindo), beautiful (lindos), wonder, wonderful (maravilhosa), wonderful (maravilhoso), wonderful (maravilhosos), best (melhor), best (melhores), very good, pride, great (ótima), great (ótimo), perfect, quality, respect, sensational, Top
Happiness	3	joy, happy, pleasure
Congratulations	4	hug, congratulations (parabéns), congratulations (parabens)
War	2	fight, save
Information	3	How do I do, contact, know
Negative	1	Sad
Religiosity	15	Blessed (abençoada), blessed (abençoado), blessing, bless, amen, angel, angels, blessing, blessings, god, faith, thanks (graças), jesus, light, lord
Health	10	Care (atendimento), câncer (câncer), câncer (cancer), surgery, care (cuidado), cure, disease, exams, prevention, treatment
Human beings	18	children, doctor, dr, dr (dra, female doctor abbreviation), nurses, team, daughter, son, staff, mother, medical, physician, doctors, patient, patients, father, professionals, professional
Solidarity	10	Help (ajuda), help (ajudar), support, campaign, donation, donor, donate, together, next, volunteer
Total	113	

The words in this table have been translated from Portuguese to English. Because the words in Portuguese vary according to gender and quantity (singular or plural), some words appear more than once in the list in English. In this case, the original Portuguese words were placed in parentheses.

bots. Bots are automated or semi-automated accounts designed to impersonate humans, with the aim of manipulating online conversations and opinions (Yang et al., 2019). In respect of **Q1**, the most frequent words within each category were “congratulations” within the category “Congratulations,” with 1,643 entrances (14% of the 113 selected words); “God” was second in the ranking with 1,334 insertions (12% of the 113 selected words). It is worth pointing out that 80% of the comments categorized as “Acknowledgements” (Table 1) were expressed by users who identified themselves as women. This is because, in Portuguese, the expression ‘thank you’ is written differently according to the gender

with which the person identifies; men say ‘obrigado’ or ‘grato’ and women say ‘obrigada’ or ‘grata’.

Of the 8,928 categorizations, 9.2% (818) referred to the narratives of only two followers of the Hospital de Amor who routinely published comments in the analyzed *corpus*. In view of this, the results of the analyses considered both the comments of the “top 2,” so identified by us, and their exclusion. Our intention was to assess whether the frequency of comments from the “top 2” interfered or not in our *corpus* (Table 2).

To answer **Q2**, Table 2 shows the ranking of the most frequent categories in each of the profiles on Instagram. It is important to note that the most

prevalent category on the Hospital de Amor page was “Praise,” and on the AC Camargo Cancer Center “Human beings,” identified here as hospital professionals, companions, patients, volunteers, collaborators or so-called “ambassadors” of the institution, usually famous artists and musicians.

In the ranking of the categories, it is clear that the Hospital de Amor page was more influential in the general ranking of the categories, because it had more followers and more comments. The authors tried to find out if there would be a more frequent crossing between the categories chosen for the present study. In Table 3, it was seen that in the Hospital de Amor, users in more than 10% of their comments associate words (Table 1) of

**Table 2.** Ranking of the categories found on the two Instagram pages, with and without the “top 2” users.

Position	Ranking ACC (%)	Ranking HA without top 2 (%)	Ranking HA with top 2 (%)	General ranking without top 2 (%)	General ranking with top 2 (%)
1	Human beings 22,01	Praise 24,42	Praise 23,84	Praise 23,23	Praise 22,87
2	Congrats 19,32	Congrats 17,40	Congrats 19,72	Congrats 17,83	Congrats 19,63
3	Praise 19,10	Religiosity 15,27	Religiosity 18,11	Religiosity 14,09	Religiosity 16,47
4	Religiosity 10,02	Human beings 10,44	Human beings 9,37	Human beings 13,03	Human beings 11,94
5	ACK 9,80	Love 10,41	Love 9,25	Love 9,51	Love 8,67
6	Health 6,82	Solidarity 6,56	Solidarity 5,81	ACK 6,70	ACK 6,08
7	Love 6,38	ACK 5,80	ACK 5,13	Solidarity 5,72	Solidarity 5,20
8	Solidarity 2,81	Health 4,80	Health 4,25	Health 5,25	Health 4,77
9	Happiness 1,82	Happiness 1,94	Happiness 1,91	Happiness 1,91	Happiness 1,89
10	War 0,94	Information 1,84	Information 1,63	Information 1,63	Information 1,48
11	Information 0,88	War 0,65	War 0,58	War 0,72	War 0,65
12	Negative 0,11	Negative 0,46	Negative 0,41	Negative 0,38	Negative 0,35

ACC = AC Camargo Cancer Center; HA = Hospital de Amor; Congrats = Congratulations ACK = Acknowledgment

“Congratulations” (hug, congratulations, and so on) with religious words (blessed, amen, angel, blessings, God, faith, thanks, Jesus, light, and sir). On the AC Camargo Cancer Center page, users usually used praise (excellent, wonderful, and so on) associated with human beings (doctors, nurses, employees, and doctors). It is worth mentioning that the combination “Congratulations” and “Religiosity” without the “top 2” would have fallen two positions in the ranking of crossed categories (from the first position to third position).

### Qualitative data

In the qualitative analysis, the authors sought to identify curious aspects of the digital narratives posted by users. Initially, they noticed a high frequency of two sentences on the Hospital de Amor page. These were “Congratulations, God bless you” and similar variations, such as “Congratulations, God bless you all,” and

“Congratulations, God bless you always.” The use of the words “congratulations” and “God” was boosted through the comments of the “top 2” on the Hospital de Amor page, increasing the frequency of “Congratulations” and “Religiosity” categories. It is important to clarify that of the 174 comments containing “Congratulations, God bless you,” 173 were made by the “top 2.” Another occurrence that deserves to be highlighted was “Big fan” and the variation “I’m a fan,” which were categorized under “Praise.” In this case, the expression was used mostly by the “top 2” on the Hospital de Amor page. On the AC Camargo Cancer Center page, the most common term was “Congratulations!” with variations that were with or without the exclamation, and encompassing the word “all.” The religious aspect hardly appeared here.

The frequency of negative words such as “crying” and “pain” was low, with less than five mentions. Because they did not reach the minimum number of citations, they were not

included in the categorization. Examples of negative sentences can be seen in the comments below:

*“My mother is a hospital patient and I am going to ask these questions of the doctors. I always look for information about this sad disease. Have a great day and thank you very much for the answer, A big hug”* (Hospital de Amor).

*“Very sad, a disease that badly mistreated my husband. He died of lung cancer, which is sad”* (AC Camargo Cancer Center).

War-related expressions, such as “fighting,” “war,” and “warrior” was also almost non-existent. The word “combat” occurred only twice. “Warrior” was mentioned 11 times. The term “battle” appeared five times in the 6,793 comments analyzed. Only the words “save” and “fight” were recorded more than 20 times. The following selected comments include some of these terms:

**Table 3.** Crossings between the 10 most frequent combinations of categories in the same comment.

General ranking without top 2	General ranking with top 2	Crossings	ACC	HA without top 2	HA with top 2	Total without top 2	Total with top 2
3	1	Congratulations + Religiosity	11	103	379	114	390
1	2	Praise + Congratulations	42	140	145	182	187
2	3	Praise + Human beings	54	65	66	119	120
4	4	Congratulations + Human beings	46	58	59	104	105
5	5	Praise + Religiosity	5	82	95	87	100
6	6	Love + Praise	6	62	64	68	70
7	7	Praise + Congratulations + Human beings	18	41	41	59	59
10	8	Praise + Congratulations + Religiosity	2	32	42	34	44
8	9	Religiosity + Human Beings	20	23	23	43	43
9	10	Love + Religiosity	2	40	40	42	42
		Top 10 most frequent category combinations	206	646	954	852	1.160

*“Congratulations to these real heroes, who use their knowledge and dedication to save lives at all layers of society and offer the people the miracle that is asked of God, carried out by these angels sent to Earth to save those who God determines!”* (AC Camargo Cancer Center)

*“Only together can we offer a better quality of life and fight the high mortality rate caused by this disease that can be cured, YES!”* (Hospital de Amor)

The categories “War” and “Negative” represented 0.65% and 0.35% of the total, respectively. But while there were few negative comments, the word “cure” and its variations, within the “Health” category, were also rarely mentioned. Two examples of a hopeful healing narrative can be seen in the comments below. The first associates religious love with human beings, while the second one links these terms to a congratulatory message to São Paulo State Oncocenter Foundation (FOSP) on its 40th anniversary:

*“May God bless this beautiful work! And that the*

*people who seek you are healed, because they are filled with love. God be present in every moment!”* (Hospital de Amor).

*“Congratulations on 61 years of a tireless and persevering fight against cancer. I take the opportunity to inform you that FOSP turned 40 today, April 25, 2014. We, AC Camargo and FOSP, are happy to be allies in the healing and rehabilitation of patients affected by head and neck cancer.”* (AC Camargo Cancer Center).

## DISCUSSION

By analyzing users’ digital narratives in a qualitative and quantitative way, the authors observed that the four most frequent categories were the same for Hospital do Amor and AC Camargo Cancer Center pages: praise, congratulation, religiosity, and human beings. Thus, it can be said that the users’ narratives were not substantially different between the two. These categories were present mostly in comments which expressed positive sentiments

(as observed in the list of words for each category and in the most frequent combinations of categories). Some studies have pointed to a high semantic association of the term cancer with words such as pain, suffering, fatality, and death. Battle metaphors increase fatalistic beliefs about cancer prevention and discourage people to immediately see their doctor when imagining a cancer scare (Hauser and Schwarz, 2020; Niederdeppe and Levy, 2007). They did not find the same patterns in their sample. Indeed, there was a preponderance of positive messages, as has been observed in previous research.

This may be due to the fact that, on Instagram and in other social media, publications with positive content tend to generate greater user engagement (Casaló et al., 2020; Picanço et al., 2018), both in health promotion and in other areas. For this reason, they believe that the prevalence of positive sentiments in our study is mainly the result of the type of content published by the two hospitals, although the analysis of those publications is not within the scope of our study. In a study with 60 Latino men and women in the United States diagnosed with cancer, it

was observed the frequent development of coping strategies that involved positive reframing, which means trying to find positive emotions that help dealing with cancer diagnosis (Carrion et al., 2017), and social media also play an important role in this regard.

An analysis of public dialogues on cervical and breast cancer screening on Twitter, a microblogging and social networking service with 290 million active users worldwide (Statista, 2021b), shows that comments about mammogram are more positive than others, especially when they mention support for friends or report non-cancerous screening results (Lyles et al., 2013). Social media is a space used to garner support and raise awareness about certain conditions, counter stigma, and reduce discrimination (Allen et al., 2020; Betton et al., 2015; Naslund et al., 2016).

Previous research concluded that reading others' comments on social media is as an important factor for online social support (Chun and Lee, 2017; Rozzell et al., 2014).

When the authors analyzed the combinations of categories present in the same comment, they saw the strong presence of the category "praise." Amongst the ten most common category combinations, it was present in six. The most common combination (with the "top 2") was "congratulations" + "religion" (n = 390). They believe that the expression of praise, congratulation, and feelings related to religiosity is a way for users to sympathize with doctors and hospital staff, and patients who are undergoing cancer treatment. Some of the authors of these comments seemed to be patients, family members, or friends of patients, as the content of the texts indicates. Even so, some users (n = 29) commented on both pages, which led us to conclude that cancer is a topic that arouses the interest of people regardless of any personal link with the hospitals. Among the motivations that lead a person to publish content on social networks are the desire to maintain connections and friendships, the desire to share their impressions of something on the internet and the longing to help others (Ghaisani et al., 2017). Social and emotional influences play an important role in media sharing behavior, and positive emotions are associated with higher incidences of media sharing than negative ones (Goh et al., 2009).

The strong occurrence of comments with religious content that is, mentioning words like "God", "blessed", "lord" and "faith" is another feature of their sample that caught their attention. The second most frequent word in the authors' corpus was "God", and in the ranking of categories on the two Instagram pages, "religiosity" is on the top 4 in all cases, with or without the top 2 users. This is in line with previous studies that indicate the strong presence of speeches of faith in moments such as the diagnosis of cancer, by patients and friends or family members (Soothill et al., 2002). An investigation conducted in Croatia with cancer patients showed that depression was less prevalent in the high-religiosity

group of breast cancer patients, and religiosity is a more easily accessible coping resource in situations of limited predictability (Aukst-Margetić et al., 2005). The same relationship between religiosity and a better quality of life among cancer patients was found in a study with Iranian Muslims (Zargani et al., 2018) and in Saudi Arabia (Al Eid et al., 2020).

Religious comments in online interactions can be a way for users to develop supportive social ties and a stronger sense of control or empowerment (Chun and Lee, 2017).

It is important to highlight that of all 8,928 categorizations, 9.2% (818) referred to the narratives of only two followers of the Hospital de Amor, who routinely published comments during the analyzed period and are probably bots. Bots on social media are used, among other reasons, to provide more likes, more shares and more clicks to social media sites (Flew and Iosifidis, 2019). It is relevant to remember that "misinformation could be spread across social media through various techniques, including automated bots and human agents who support some kind of propaganda" (Yang and Horning, 2020).

The authors noted a considerable female presence in the digital narratives of their corpus, since 80% of the comments categorized as "Acknowledgements" were written by users who identified themselves as women. They do not have access to user demographics on the two Instagram pages, but men and women write words such as "thank you" or "thankful" differently in Portuguese language, as there is a gender inflection in this case. This fact seems to indicate that most digital narratives on the two Instagram pages are created by women. The same trend was already observed in other investigations on gender and engagement in social media (Brandtzaeg, 2017; Ross et al., 2015). A study that analyzed posts of individuals with mental illness on Twitter revealed significant differences between the content shared by female and male users; males express higher negativity and lower desire for social support compared to women (De Choudhury et al., 2017). A systematic literature that examined gender differences in healthcare utilization of lung cancer patients revealed that women tend to get diagnosed at an earlier stage and have a higher probability of using inpatient cancer-care services (Rezwanul et al., 2020).

## Conclusion

In the content analysis of Brazilian cancer hospitals' Instagram accounts, the predominant characteristic of user comments was that of positivity, even though cancer is a disease laden with negative stigma. It was believed that this is a positive aspect of these speeches, since it can reduce the readers' fear about the diagnosis of the disease; this can even indirectly lead to an increase in the number of preventive tests. The authors saw a strong

presence of social support messages, which seemed to be aimed to motivate patients and medical staff. Users' positive discourses can also be influenced by the content of the posts where the comments were published, but we have not been able to verify this in this study.

Religiosity was also a hallmark of these narratives, and the same relationship between the diagnosis of cancer and the manifestation of faith, and positivity is observed in other studies, in different cultural backgrounds. In addition, women are also the ones who author social support messages the most in social media. Further study may explore the sociodemographic characteristics and the gender of the users who produce these types of narratives about cancer, to better understand their aims and motivations. It would also be interesting to investigate specific ways of engaging different audiences in health promotion issues, a subject that is becoming increasingly important.

## FUNDING

This study was supported by the (Brazilian) National Council for Scientific and Technological Development (Conselho Nacional de Desenvolvimento Científico e Tecnológico) grant number 304575/2019-4, and the Carlos Chagas Filho Foundation (Fundação Carlos Chagas Filho de Amparo à Pesquisa do Estado do Rio de Janeiro), grant number E-26/202.929/2019.

## CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

## REFERENCES

- A.C.Camargo Cancer Center. 2020. Nossa história. A.C.Camargo Cancer Center. Retrieved October 20, 2021 Available at: <http://www.accamargo.org.br/en/node/2658>.
- Al Eid NA, Alqahtani MM, Marwa K, Arnout BA, Alswailem HS, Al Toaimi AA (2020). Religiosity, psychological resilience, and mental health among breast cancer patients in Kingdom of Saudi Arabia. *Breast Cancer (Auckl)* 14, 117822342090305.
- Allen CG, Roberts M, Andersen B, Khoury MJ (2020). Communication about hereditary cancers on social media: A Content Analysis of Tweets about hereditary breast and ovarian cancer and Lynch Syndrome. *Journal of Cancer Education* 35(1):131-137.
- Aufa B, Sulistiadi W, Djawas FA (2020). Measuring Instagram activity and engagement rate of hospital: a comparison before and during Covid-19 pandemic. 562-566 in 2020 3rd International Seminar on Research of Information Technology and Intelligent Systems (ISRITI). Yogyakarta, Indonesia: IEEE.
- Aukst-Margetić B, Jakovljević M, Margetić B, Bišćan M, Šamija M (2005). Religiosity, depression and pain in patients with breast cancer. *General Hospital Psychiatry* 27(4):250-255.
- Bardin L (2011). *Análise de Conteúdo*. São Paulo: Ed. Revista e Ampliada.
- Basch C, MacLean S (2019a). Breast cancer on Instagram: A descriptive study. *International Journal of Preventive Medicine* 10:166.
- Basch C, MacLean S (2019b). Colorectal cancer on Instagram: A Content Analysis. *Journal of Consumer Health on the Internet* 23(4):378-383.
- Betton V, Borschmann R, Docherty M, Coleman S, Brown M, Henderson C (2015). The role of social media in reducing stigma and discrimination. *The British Journal of Psychiatry* 206(6):443-444.
- Brandtzaeg PB (2017). Facebook is no "great equalizer": A big data approach to gender differences in civic engagement across countries. *Social Science Computer Review* 35(1):103-125.
- Carrion IV, Nedjat-Haiem F, Macip-Billbe M, Black R (2017). "I told myself to stay positive" Perceptions of coping among latinos with a cancer diagnosis living in the United States. *American Journal of Hospice and Palliative Care* 34(3):233-240.
- Casaló LV, FlaviánC, Ibáñez-Sánchez S (2020). Be creative, my friend! Engaging users on Instagram by promoting positive emotions. *Journal of Business Research* S0148296320301089.
- Charalambous A (2019). Social media and health policy. *Asia-Pacific Journal of Oncology Nursing* 6(1):24-27.
- Chun JW, Lee MJ (2017). When does individuals' willingness to speak out increase on social media? Perceived social support and perceived power/control. *Computers in Human Behavior* 74:120-129.
- Dadich A, Khan A (2020). Using Twitter to promote a youth mental health agenda. *Health Promotion International* 36(1):235-249.
- De Choudhury M, Sharma SS, Logar T, Eekhout W, Nielsen RC (2017). Gender and cross-cultural differences in social media disclosures of mental illness, in: *Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing*. Portland Oregon USA pp. 353-369.
- Flew T, Iosifidis P (2019). Populism, globalisation and social media. *International Communication Gazette* 82(1):7-25.
- Forsey C (2020). How to use Instagram: A beginner's guide Available at: <https://blog.hubspot.com/marketing/how-to-use-instagram>
- Ghaisani AP, Handayani PW, Munajat Q (2017). Users' motivation in sharing information on social media. *Procedia Computer Science* 124:530-535.
- Gill HK, Gill N, Young SD (2013). Online technologies for health information and education: A literature review. *Journal of Consumer Health on the Internet* 17(2):139-150.
- Goh DHL, Ang RP, Chua AYK, Lee CS (2009). Why we share: A study of motivations for mobile media sharing, in: Liu, J., Wu, J., Yao, Y., Nishida, T. (Eds.), *Active media technology, lecture notes in Computer Science*. Springer Berlin Heidelberg, Berlin, Heidelberg pp. 195-206.
- Goldenberg JL, Arndt J (2008). The implications of death for health: A terror management health model for behavioural health promotion. *Psychological Review* 115(4):1032-1053.
- Grant JA, Hundley H (2009). Images of the war on cancer in the Associated Press: Centering survivors and marginalizing victims. *American Communication Journal* 11:16.
- Guidry JPD, Yan Jin CA, Orr MM, Meganck S (2017). Ebola on Instagram and Twitter: How health organizations address the health crisis in their social media engagement. *Public Relation Review* 43(3):477-486.
- Hauser DJ, Schwarz N (2020). The war on prevention II: Battle metaphors undermine cancer treatment and prevention and do not increase vigilance. *Health Communication* 35(13):1698-1704.
- Holland G, Tiggemann M (2016). A systematic review of the impact of the use of social networking sites on body image and disordered eating outcomes. *Body Image* 17:100-110.
- Hospital de Amor (2020). Institucional. Hospital de Amor. Retrieved October 20, 2021. Available at: <https://hospitaldeamor.com.br/site/institucional/>.
- Hunt D (2015). The many faces of diabetes: A critical multimodal analysis of diabetes pages on Facebook. *Language & Communication* 43:72-86.
- INCA (2007). INCA divulga pesquisa de opinião dos brasileiros sobre o câncer Available at: [http://www1.inca.gov.br/releases/press\\_release\\_view\\_arq.asp?ID=1396](http://www1.inca.gov.br/releases/press_release_view_arq.asp?ID=1396).
- Kristensen DB, Prigge C (2018). Human/technology associations in self-tracking practices. In: Ajana, B. (Ed.), *Self-tracking*. Palgrave Macmillan. pp. 43-60.
- Lyles CR, López A, Pasick R, Sarkar U (2013). "5 mins of uncomfyness



- is better than dealing with cancer 4 a lifetime": An exploratory qualitative analysis of cervical and breast cancer screening dialogue on Twitter. *Journal of Cancer Education* 28(1):127-133.
- Machado GOC, Biancovilli P, Jurberg C (2017). Voices about a stigma: Cancer in the opinion of three different segments in Brazilian society. *Journal of Cancer Education* 32(2):413-416.
- Maganã D, Matlock T (2018). How Spanish speakers use metaphor to describe their experiences with cancer. *Discourse & Communication* 12(6):627-644.
- Marrapondi EJ (2017) Use of social media for consumer health outreach in a solo hospital library. *Journal of Consumer Health on the Internet* 2194:325-337.
- Minayo MCS, Sanches O (1993). Quantitativo-qualitativo: oposição ou complementaridade? *Caderno de Saúde Pública* 9(3):237-248.
- Naslund JA, Aschbrenner KA, Marsch LA, Bartels SJ (2016). The future of mental health care: peer-to-peer support and social media. *Journal of Epidemiology and Psychiatric Science* 25:113-122.
- Niederdeppe J, Levy AG (2007). Fatalistic beliefs about cancer prevention and three prevention behaviors. *Cancer Epidemiology Biomarkers and Prevention* 2007;16(5):998-1003.
- Oliveira EM, Salgado TJ, Thomer L, Jurberg C (2019). Esperança x sofrimento nas mídias sociais: o que motiva seguidores do Instagram a seguir a temática câncer? *Revista Eletrônica de Comunicação, Informação e Inovação em Saúde* 13.
- Picanço L, Biancovilli P, Jurberg C (2018). Beyond the drama: the beautiful life in news feeds on cancer. *Journal of Cancer Education* 33:424-428.
- Rezwanul HR, Alam F, Alam K, Gow J (2020). Gender-specific differences in care-seeking behaviour among lung cancer patients: a systematic review. *Journal of Cancer Research Clinic Oncology* 146(5):1169-1196.
- Ross K, Fountaine S, Comrie M (2015). Facing up to Facebook: politicians, publics and the social media(ted) turn in New Zealand. *Media, Culture and Society* 37:251-269.
- Rozzell B, Cameron WP, Carr CT, King Sn, Lane BL, Tornes M, Johnson AJ, Wright KB (2014). Notification pending: online social support from close and nonclose relational ties via Facebook. *Computers in Human Behavior* 38:272-280.
- Salles F (2020). Quantos usuários do Instagram existem no Brasil e no mundo? | AppTuts. 2020. Available at: <https://www.apptuts.net/tutorial/redes-sociais/quantos-usuarios-do-instagram-existem-no-brasil-mundo-2017/>.
- Sontag S (1991). *Illness as metaphor and Aids and its metaphors*. Penguin.
- Soothill K, Morris SM, Harman JC, Thomas C, Francis B, McIlmurray MB (2002). Cancer and faith. Having faith - does it make a difference among patients and their informal carers? *Scandinavian Journal of Caring Science* 16(3):256-263.
- Statista (2020). "Number of Social Media Users Worldwide." Statista. Retrieved September 24, 2020. Available at: <https://www.statista.com/statistics/278414/number-of-worldwide-social-network-users/>.
- Statista (2021a). Most used social media 2021. Statista. Available at: <https://www.statista.com/statistics/272014/global-social-networks-ranked-by-number-of-users/>.
- Statista (2021b). Twitter: Number of users worldwide 2019-2020. Statista. Retrieved October 20, 2021 Available at: <https://www.statista.com/statistics/303681/twitter-users-worldwide/>.
- Tifentale A, Manovich L (2015). Selficity: Exploring photography and self-fashioning in social media. In: Berry, D. M., Dieter, M. (Eds.), *Postdigital aesthetics: Art, computation and design*. Palgrave Macmillan pp. 109-122.
- Tiggemann M, Barbato I (2018). "You look great!": The effect of viewing appearance-related Instagram comments on women's body image. *Body Image* 27:61-66.
- Ventola CL (2014). Social media and health care professionals: benefits, risks, and best practices 39(7):491-520.
- VERBI Software (2017). MAXQDA 2018. Berlin: VERBI Software.
- Yang F, Horning M (2020). Reluctant to share: How Third Person Perception on fake news discourage news readers from sharing "real news" on social media. *Journal of Social Media + Societ* 6(3).
- Yang K, Varol O, Davis CA, Ferrara E, Flammini A, Menczer F (2019). Arming the public with artificial intelligence to counter social bots. *Human Behaviour and Emerging Technologies* 1(1):48-61.
- Zargani A, Nasiri M, Hekmat K, Abbaspour Z, Vahabi S (2018). A Survey on the relationship between religiosity and quality of life in patients with breast cancer: A study in Iranian Muslims. *Asia-Pacific Journal of Oncology Nursing* 5:217.