Revista de Comunicación y Salud, 2022 Vol. 12, 25-43
Editado por Cátedra de Comunicación y Salud
ISSN: 2173-1675

Enviado 29/07/2021
Aprobado 10/11/2021
Publicado 18/01/2022

ANÁLISIS DE LA PRESENCIA ONLINE DE LAS ORGANIZACIONES DE CÁNCER DE MAMA EN DIFERENTES CONTEXTOS GEOGRÁFICOS

Analysis of breast cancer organizations' online presence in different geographical contexts

María Isabel Míguez-González.
Universidade de Vigo. España.
mabelm@uvigo.es

Silvia García-Mirón.
Universidade de Vigo. España.
silviamiron@uvigo.es

Emma Torres-Romay.
Universidade de Vigo. España.
emmatr@uvigo.es

Cómo citar el artículo

Míguez-González, M-I., García-Mirón, S. y Torres-Romay, E. (2022). Análisis de la presencia online de las organizaciones de cáncer de mama en diferentes contextos geográficos. *Revista de Comunicación y Salud*, 12, 25-43. http://doi.org/10.35669/rcys.2022.12.e294

Resumen

Este artículo ofrece un análisis descriptivo de la actividad e impacto online de las organizaciones de cáncer de mama en diferentes contextos geográficos, con distintos niveles de desarrollo económico y tecnológico y diferentes tasas de incidencia y mortalidad, con una muestra de 24 organizaciones de 24 países. El análisis considera

variables como la frecuencia de publicación, el tiempo de presencia en las redes sociales y el número y evolución de me gusta, visualizaciones, seguidores y suscriptores. Los resultados muestran que las organizaciones de los países más desarrollados cuentan con una presencia más temprana y variada en el mundo online. La incidencia de la enfermedad se correlaciona con la presencia de estas organizaciones en las redes sociales y con sus resultados de recepción, mientras que la tasa de mortalidad no se relaciona con estos aspectos. Facebook es la red más utilizada; sin embargo, Instagram, con mejor rendimiento y un creciente número de usuarios, es una buena alternativa para las organizaciones que deseen fortalecer su actividad online. Estos resultados confirman la necesidad de ampliar la perspectiva de los estudios de comunicación online de las organizaciones de cáncer de mama considerando los países subdesarrollados o en vías de desarrollo. Esto ayudará a las organizaciones a desarrollar prácticas más efectivas que, considerando el creciente uso de las redes sociales en estos países, podría tener un impacto significativo en el medio plazo.

Palabras clave: eHealth, cáncer, organizaciones de cáncer de mama, comunicación, redes sociales

Abstract

This paper contributes offers a descriptive analysis of the online activity and impact of breast cancer organizations in different geographical contexts, with different economic and technological development levels and different incidence and mortality rates, with a sample of 24 organizations from 24 countries. The analysis considers variables such as posting frequency, time of presence on the social network and number and evolution of likes, views, followers, and subscribers. The results show that the organizations from the more developed countries have an earlier and more varied presence on the online world. Disease's incidence correlate to a certain extent with the presence of these organizations on social networks and with their reception results while mortality rate is not related to these aspects. Facebook is the most used network; however, Instagram, with better performance and a growing number of users, is a good alternative for organizations that want to strengthen their online activity. These results confirm the need to broaden the perspective of studies on the online communication of breast cancer organizations, considering underdeveloped or developing countries. This will help these organizations to develop more effective practices that, considering the increasing use of social media in these countries, might have a meaningful impact in the medium term.

Keywords: eHealth, cancer, breast cancer organizations, communication, social media

1. INTRODUCTION

Breast cancer accounts for 11.6% of all cancers diagnosed in the world, it is the second most common cancer and the most frequent, by far, among women (Bray et al., 2018). According to Globocan 2018 (International Agency for Research on Cancer & World Health Organization, 2020), breast cancer has an incidence of 46.3 cases per 100,000 among women, followed far behind by lung cancer (14.6 per 100,000). Although incidence rates are higher in Australia, Europe and North America than in most African regions, mortality rate variations are small, and despite the fact that mortality is declining significantly in the richest and most developed countries, it still shows slight increases in developing countries (The Cancer Atlas, n.d; Amadou et al., 2014). It is, therefore, a widely spread disease (Ponce-de-León et al., 2016), with a high potential for cure in case of early detection.

As is the case with other diseases, audiences that are highly involved in a topic are more likely to actively search for information about it. Thus, people interested in or affected by breast cancer will tend to seek information and/or support through all means at their disposal (Hallyburton; Evarts, 2014; Li et al., 2014; Li et al., 2016; Namkoong et al., 2017). With a worldwide penetration of 57% (We are social and Hootsuite, 2019), the Internet is one of the sources where these interested audiences can seek greater amounts of information quickly and easily, although this information is not always reliable and may have been published by non-health organizations or influencers (Jiménez-Marín et al., 2021).

On the other hand, public awareness on breast cancer, prevention, early detection, fundraising for research or information dissemination on the process of dealing with cancer and its treatments are key elements to reduce the disease's mortality. Therefore third-sector organizations have been making communication efforts related to some of these aspects and they have found in the Internet, where active audiences seek information urgently, a suitable and cheap way to spread their message.

Approximately 45% of the world population uses networks, although there are huge variations across continents, ranging from 17% penetration rate in Africa (with a 13% increase compared to the previous year) to 66% in America. Facebook (2.1 billion users) remains the most widespread social network, followed by YouTube (1.9 billion users). Excluding messaging networks, the next would be Instagram, which, with a 4.4% increase, reaches 1 billion users. Twitter, with a 2.7% decline, remains at 326 million users (We are social and Hootsuite, 2019).

Over the last few years, there have been abundant studies on the use of these social networks in connection with cancer in general, and particularly breast cancer. Specific research related to Twitter and breast cancer is abundant. Thackeray et al. (2013) analyzed tweets about breast cancer posted by different types of users. Other researchers focused on Twitter include Kim et al. (2016), who studied the elements that have an impact on retweeting behavior on breast cancer, Natasi et al. (2017), who focused on Twitter users' discussions about breast cancer screening recommendations,

or Clark et al. (2018), who evaluated the usefulness of the network in addressing patients' feelings. Regarding cancer in general, Xu et al. (2016) analyzed the frequency of discussions about this disease and highlighted the benefits of social networks as a tool in reducing racial and ethnic disparities.
Research studies related to Instagram are very recent. Vraga et al. (2018) compare traffic about breast cancer, prostate cancer and other reproductive cancers on Twitter and Instagram, while Basch and MacLean (2019) analyze the content of the posts published on Instagram with the hashtag #breastcancer.

In the case of YouTube, according to Madathil, et al. (2015), this network is increasingly being used to disseminate health information. Several studies analyze YouTube videos related to prostate cancer (Basch et al., 2017), mouth (oral) cancer (Hassona et al., 2016), skin cancer (Ruppert et al., 2016; Basch et al., 2015; Myrick, Oliver, 2014) or cervical cancer (Adhikari et al., 2016) and gynecologic cancer (Cooper et al, 2016), among others.

However, the studies that specifically analyze social network communication efforts undertaken by organizations dedicated to breast cancer are less abundant and largely focused on Facebook and the Western context.

Abramson et al. (2015) analyzed Breast Cancer Organization's Facebook posts during October 2010, concluding that they included little information on health, while the research carried out by Fernández-Gómez and Díaz-Campo (2016) on communication about cancer on Facebook by organizations of Argentina, Chile, Colombia and Spain indicated that almost half of the messages were aimed at raising awareness. Other studies are focused on engagement, and both Strekalova and Krieger (2016), who analyzed National Cancer Institute's Facebook content, and Theiss et al. (2016), who focused on CDC Breast Cancer's posts, concluded that posts with images generate more engagement than videos, links or status updates. As for Corbacho-Valencia et al. (2018), they analyzed most engaging posts from 21 organizations (mostly from the United States), concluding that posts most preferred by users are largely aimed at raising awareness.

In the case of Twitter, it is worth mentioning the study by Diddi and Lundi (2017), who analyzed how four organizations used this network during Breast Cancer Awareness Month, in line with the theoretical parameters of the Health Belief Model.

Thus, there is a gap in the description and analysis of the online presence and communication efforts made by organizations specifically related to breast cancer, particularly from the perspective of geographical diversity. By assuming, as advocated by Xu et al. (2016), that social networks help to reduce racial and ethnic disparities, in a context in which the expansion of social networks is increasingly evident even in less developed countries, we are also acknowledging its key role as disseminators of information in a wide range of countries and not only in Western communication models. Therefore, it may be interesting to analyze the patterns of presence and use of online

communication by organizations related to breast cancer, as well as the response from their audiences, especially if analyzed in light of statistical data on the disease's incidence and mortality, in order to understand whether the networks' informational and educational potential is being leveraged globally.

2. OBJECTIVES

Based on this approach, the aim of this study is to carry out a descriptive in-depth analysis of the online presence, activity and impact of breast cancer organizations in different geographical contexts, with different economic and technological development levels and different incidence and mortality rates. Taking into account that, as Globocan 2018 (International Agency for Research on Cancer & World Health Organization, 2020) statistics show, breast cancer is a disease with a higher incidence in economically and technologically developed countries and that these countries, with only a few exceptions, are usually the ones with higher Internet penetration and higher percentage of active social network users, it can be expected that organizations from the countries with higher development level will have an earlier and stronger presence on the online world, more diverse in terms of publications and with greater impact. In this sense, the research will also try to determine if any correlation can be established between the presence in social networks of the organizations analyzed and the incidence and mortality rates of the countries to which they belong.

3. MATERIALS AND METHODS

With a view to achieving geographical heterogeneity, the sample was created using as reference the list of organizations set out on the website of the Union for International Cancer Control (UICC). Through a keyword search process, the organizations specifically dedicated to breast cancer were selected, resulting in a list of 48 organizations from 28 different countries. Given that the sample was intended to include only one organization per country, in the case of the countries with several organizations, the selection was made according to the following criteria, in order of importance:

1. National organizations were prioritized over regional organizations.
2. Organizations dedicated to breast cancer in general were prioritized over those addressing specifically any of its aspects (such as the organizations of mastectomized women or breast cancer patients).
3. Organizations emerging from collective or institutional initiatives were prioritized over those emerging from individual or corporate efforts.
4. Organizations that were present on social networks were prioritized over those that were not, and among them, those with the most up-to-date publications and with the largest number of followers.

The removal of duplications and of organizations not present on social networks led to a final sample of 24 organizations from 24 countries.

Social network analysis focused both on emission, in connection with the posts published (number of posts, evolution of the numbers of publications, type of posts) and with the time of presence on the social network, and on reception (number and evolution of likes or views, in the case of Facebook, and number and evolution of followers and subscribers, also in the case of YouTube). For collecting and analyzing data on Facebook, in addition to using the data on likes and followers provided by the network itself, and since the application does not provide the total number of posts published, a Facebook-native application called Netvizz was used; it allowed the analysis of the posts published in a one-year period, between May 1, 2018 and April 30, 2019, the month prior to the beginning of the study. Regarding other social networks, public data provided by the networks themselves were used; a first collection was made at the beginning of the study (May 2019) and a second one, in February 2020. Netvizz's suspension made it impossible to collect data from Facebook and to update the number of posts published as expected.

4. FINDINGS

4.1. General data on the sampling

In relation to the disease's incidence and mortality rates, the former ranges from 94.5 per 100,000 in Australia and 21.3 per 100,000 in Uganda, whereas mortality ranges from 25.4 per 100,000 in Sierra Leone and 7.5 per 100,000 in Saudi Arabia (table 1). In all the countries represented in the sample, except Uganda and Senegal, breast cancer was the most diagnosed type of cancer among women in 2018; five of them were also among the 25 countries with the highest breast cancer incidence worldwide: Australia, the United Kingdom, Malta, the United States and Canada (The Cancer Atlas, n.d.).

Regarding their online presence, only three of the organizations do not have a website. Social networks most used by these organizations are Facebook (92% of the organizations), Twitter (54%), YouTube (46%) and Instagram (37.5%); however, the organizations from Australia, Brazil, Canada, the United Kingdom and the United States are the only ones present on all four networks. Instagram can be understood as a complementary tool to other media, since all the organizations that have an Instagram account are also present on Facebook and on, at least, one more network (YouTube or Twitter). In total, 53.8% of the organizations are present on more than one social network. In all the networks there are cases of accounts that were launched and abandoned or were never used (table 1).

Table 1.*Incidence and mortality ASR and online presence*

Country	Organization	I-ASR	M-ASR	% active users	Web	Join date			
						Facebook	Twitter	YouTube	Instagram
Australia	National Breast Cancer Foundation	94.5	12.3	72%	Yes	2008	2008	2007	2012
Brazil	Federação Brasileira de Instituições Filantrópicas de Apoio à Saúde da Mama (FEMAMA)	62.9	13	66%	Yes	2012	2011	2011	2018
Canada	Rethink Breast Cancer	83.8	12.1	67%	Yes	2009	2009	2009	2015
China	Global Chinese Breast Cancer Organizations Alliance	36.1	8.8	71%	Yes	2012	No	No	No
Costa Rica	Asociación Tour Rosa de Costa Rica	46.7	12.2	72%	No	2017	No	No	2015
Ghana	Breast Care International (BCI)	43	17.7	19%	Yes	2013	No	No	No
Indonesia	Indonesian Breast Cancer Foundation / Yayasan Kanker Payudara Indonesia	42.1	17	56%	Yes	2018	2013	2015	2015
Kenya	Women 4 Cancer Early Detection & Treatment	40.3	17.8	16%	Yes	2012	2012	No	2016
Malaysia	Pink Ribbon Wellness (L) Foundation	47.5	18.4	78%	Yes	2012	No	Data not available (inactive)	No
Malta	Action for Breast Cancer Foundation	87.6	12.7	88%	Yes	2010	No	No	No
Mauritius	Breast Cancer Care	69.6	21.8	65%	No	2016	No	No	No
Mexico	Tómatelo a Pecho, A.C.	39.5	9.9	67%	Yes	2014	2010	2011	No
Nigeria	Breast Cancer Association of Nigeria (BRECAN)	41.7	18.8	12%	Yes	2009	No	2017 (inactive)	No
Peru	ALIADA	40	10.3	73%	Yes	2013 (inactive)	No	2013	No
Philippines	I Can Serve Foundation	52.4	17.5	71%	Yes	2011	2010	Data not available (active)	2013
Saudi Arabia	Sheikh Mohammed Hussien Al-Amoudi Center of Excellence in Breast Cancer (SMHA-CEBC)	27.3	7.5	68%	Yes	No	2011	No	No
Senegal	Association Cancer du Sein du Sénégal	32.8	16	21%	No	2013	No	No	No
Sierra Leone	Thinking Pink Breast Cancer Foundation	43.6	25.4	8%	Yes	2012	No	2018 (inactive)	No
South Africa	PinkDrive	49	16.3	40%	Yes	2010	2010	2013	No
Spain	Federación Española de Cancer de Mama - FECMA	75.4	10.6	60%	Yes	2010	2012	No	No
Tunisia	Association Tunisienne d'Assistance aux Malades du Cancer du Sein	32.2	10.3	64%	Yes	2013	No	2016	2017 (inactive)
Uganda	Uganda Women's Cancer Support Organization (UWOCASO)	21.3	10.3	6%	Yes	2011	2017	No	No
UK	Breast Cancer Now	93.6	14.4	67%	Yes	2008	2009	2015	2012
US	Susan G. Komen for the	84.9	12.7	70%	Yes	2007	2008	2007	2015

	Cure								
% of organizations with online or social network presence					**87.5%**	**91.67%**	**54,17%**	**45.83%**	**37.50%**

I-ASR: Incidence age-standardized rate in 2018 (International Agency for Research on Cancer, 2020). M-ASR: Mortality age-standardized rate in 2018 (International Agency for Research on Cancer, 2020). % active users: Percentage of active social network users in the country (We are social & Hootsuite, 2019).

Source: *author's elaboration*

The integration of the organizations into the online world has been gradual since 2007, with a significant boom in the period from 2010 to 2013. Also, since 2016, the incorporation into new social networks has slowed down, up to the point that no new accounts were created on any of the four social networks in 2019. Some organizations, such as Rethink Breast Cancer, Susan G. Komen for the Cure, National Breast Cancer Foundation or FEMAMA, adopted a unified strategy of integration into social networks, by joining Facebook, Twitter and YouTube in the same year or in two consecutive years, and by joining Instagram much later, in line with the subsequent rise of this network (table 1).

More specifically, regarding Instagram, it is striking that the United Kingdom, Australia and the Philippines created their accounts before 2014 and, therefore, before the boom of this network. In the case of Facebook, even though at the time of the analysis 22 of the 24 organizations have a Facebook account, their entry into the most widespread social network in the world has been highly variable over time. Organizations from countries such as the United States, the United Kingdom, Australia, and Canada were pioneers, creating their accounts in 2007, 2008 and 2009. On the contrary, the Indonesian organization did not join Facebook until 2018, and the one from Costa Rica did it in 2017 (table 1).

A certain correlation is observed between the disease's incidence and the number of networks on which the organizations are present ($r = 0.473$). Out of the five countries with the highest incidence, four are present on all the analyzed networks, whereas the organizations from the five countries with the lowest incidence are only present on one or two networks. On the contrary, this is not the case with mortality ($r = 0.090$); as a matter of fact, the three countries with the highest mortality rates are Sierra Leone, Mauritius, and Nigeria, which are only present on Facebook. A positive correlation is also observed between the percentage of active social network users in each country according to Global Digital Report 2019 (We are social & Hootsuite, 2019) and the number of networks on which the organizations are present ($r = 0.638$).

4.2. Social network activity: transmission data

In line with the normal usage of the different networks, Twitter records the highest average number of posts per day, while YouTube has the lowest average frequency rate. Likewise, Instagram has already surpassed Facebook in terms of posting frequency, although this may be because organizations with an Instagram account are, broadly speaking, more advanced in the use of social networks (table 2).

Table 2.*Average number of daily posts per social network during the reporting period and since the beginning of their activity on the network.*

COUNTRY	Average daily posts during the reporting period				Average daily posts since the beginning of their activity on the network		
	Facebook	Twitter	YouTube	Instagram	Twitter	YouTube	Instagram
Australia	0.855	0.510	0.007	0.631	1.809	0.017	0.428
Brazil	0.800	0.622	0.070	0.587	1.122	0.029	0.570
Canada	1.532	1.466	0.066	0.948	3.933	0.061	0.767
China	0.233	n	n	n	n	n	n
Costa Rica	0.203	n	n	0.179	n	n	n
Ghana	0.132	n	n	n	n	n	n
Indonesia	0.866	0.247	0.115	1.179	0.409	0.047	0.861
Kenya	0.096	0.725	n	n	1.499	n	0.052
Malaysia	0.337	n	n	n	n	n	n
Malta	0.258	n	n	n	n	n	n
Mauritius	0.071	n	n	n	n	n	n
Mexico	1.778	3.040	0	n	5.351	0.068	n
Nigeria	0.178	n	n	n	n	n	n
Peru	n	n	0.014	n	n	0.010	n
Philippines	0.690	0.534	0.031	0.651	0.630	N/A**	0.465
Saudi Arabia	n	0.287	n	n	1.022	n	n
Senegal	0.044	n	n	n	n	n	n
Sierra Leone	0.077	n	n	n	n	n	n
South Africa	2.252	1.594	0.059	n	5.357	0.064	n
Spain	0.126	2.163	n	n	1.195	n	n
Tunisia	0.364	n	0.038	n	n	0.035	n
Uganda	0.252	0.382	n	n	0.575	n	n
United Kingdom	0.203	-79.825	0.038	-1.262	10.547	0.147	0.432
United States	1.104	3.733	0.268	1.631	3.513	0.101	0.613
Mean	**0.566**	**1.052**	**0.071**	**0.696**	**2.082**	**0.058**	**0.524**
Median	**0.255**	**0.673**	**0.049**	**0.651**	**1.499**	**0.054**	**0.518**

*The average has been calculated considering only the organizations that have posted during the reporting period. The case of the United Kingdom has not been taken into account for the calculation of maximums, minimums, averages and correlations with regard to Twitter and Instagram, since the total number of posts provided by the networks themselves on the second collection date was significantly lower than on the first one; this seems the result of a voluntary deletion of posts, impeding an actual estimation of the evolution of that organization on the two networks. **Join date not available.

Source: *author's elaboration*

The comparison between the average number of daily posts made by the most and least active organizations in each social network during the reporting period shows sharp differences in posting frequency. The U.S. organization is the most active on Twitter, YouTube, and Instagram, but is surpassed by other three organizations as regards Facebook. Other highly active organizations are the one from South Africa, with the

highest average number of posts on Facebook and also a high average on Twitter and YouTube, the one from Mexico, which holds the second position in the two networks on which it is present (Facebook and Twitter), and the one from Canada, which is in the top 5 on all four networks. Also, in the top 5 on Facebook, YouTube and Instagram is the Indonesian organization, despite being the least active on Twitter. On the contrary, the organizations from Senegal, Mauritius and Sierra Leone record the lowest activity, almost residual, on Facebook, despite this being the only network on which they have an account (table 2).

On the other hand, some interesting trends are observed when analyzing the average number of daily posts made by each organization since the day they began their activity on Twitter, YouTube and Instagram (Facebook is not included, since the total number of posts is not available). In the case of Twitter, all the organizations have reduced their activity on this network, except Spain, which records a substantially higher average posting frequency during the reporting period compared with the total, and the U.S., which shows a slight increase. On the contrary, all the organizations with an Instagram account have increased their activity on this network. In the case of YouTube, six organizations have increased their average posting frequency during the reporting period, whereas four of them have decreased it (table 2).

Correlation data between the disease's incidence and mortality rates in each country and their average number of daily posts on their social networks do not yield significant results.

4.3. Social network activity: Reception data

There are sharp differences between likes, followers, views, or subscribers accumulated by the organizations with the highest figures (maximums) and those with the lowest (minimums), causing means to be poorly representative. Taking into account that these global data may depend to a large extent on the time of presence on each social network, the table 3 details, for each organization, the average number of likes, followers, views and subscribers per day (since they began their activity on the network).

Table 3.*Reception data*

	FACEBOOK		TWITTER		YOUTUBE		INSTAGRAM
	Likes	**Followers**	**Likes**	**Followers**	**Views**	**Subscribers**	**Followers**
Max.	1962575	1897008	23263	162169	10825277	4120	66761
Min.	338	359	5	198	2079	14	745
Mean	129716	124788	3580	28574	1317043	839	21601
Median	3410	3469	1252	2493	82117	329	12879
COUNTRY	**Likes per day**	**Followers per day**	**Likes per day**	**Followers per day**	**Views per day**	**Subscribers per day**	**Followers per day**
Australia	24.262	24.438	1.747	3.65	201.89	0.163	3.121
Brazil	13.685	13.809	0.009	0.315	65.104	0.212	18.002
Canada	8.309	8.322	1.296	2.106	2760.142	1.05	11.336
China	0.359	0.381	n	n	n	n	n

Costa Rica	2.641	2.645	n	n	n	n	10.258
Ghana	0.814	0.827	n	n	n	n	n
Indonesia	1.466	1.539	0.002	0.432	5.13	0.148	7.244
Kenya	0.573	0.587	0.886	0.762	n	n	0.618
Malaysia	1.39	1.407	n	n	n	n	n
Malta	1.027	1.051	n	n	n	n	n
Mauritius	1.722	1.742	n	n	n	n	n
Mexico	1.294	1.324	1.081	1.435	3.771	0.012	n
Nigeria	0.863	0.873	n	n	n	n	n
Peru	n	n	n	n	32.178	0.129	n
Philippines	2.43	2.46	0.078	0.154	N/A*	N/A*	0.943
Saudi Arabia	n	n	0.126	0.46	n	n	n
Senegal	0.482	0.49	n	n	n	n	n
Sierra Leone	0.627	0.629	n	n	n	n	n
South Africa	4.387	4.498	0.692	14.467	7.915	0.018	n
Spain	0.486	0.529	0.133	0.856	n	n	n
Tunisia	4.96	5.019	n	n	1.489	0.01	n
Uganda	0.31	0.316	0.105	0.197	n	n	n
United Kingdom	213.39	199.726	5.934	41.37	452.725	0.355	21.64
United States	441.33	426.582	0.302	29.683	338.771	0.491	36.402
Mean	**33.036**	**31.782**	**0.953**	**7.376**	**386.912**	**0.259**	**12.174**
Median	**1.428**	**1.473**	**0.302**	**0.856**	**48.641**	**0.156**	**10.258**

*Join date not available.

Source: *author's elaboration*

The comparison of likes between Facebook and Twitter confirms the prominence of the former over the latter, while the data on YouTube views are quite positive, with a median of more than 48 views per day. In the case of Facebook, the U.S. organization records the highest average of likes, far above the others, followed by the British organization. In Twitter, with the United Kingdom in the lead, differences are much less noticeable. In YouTube, Canada stands out considerably in terms of views (table 3).

Regarding followers and subscribers, YouTube's numbers are very modest, and Instagram shows very significant data considering that it is much more recent. The U.S. organization, once again, records the highest average number of followers per day both on Facebook and on Instagram, while the United Kingdom reaches the highest average number of followers on Twitter, and Canada, the highest average number of subscribers on YouTube. The minimum values correspond to Uganda on Facebook, the Philippines on Twitter, Tunisia on YouTube, and Kenya on Instagram (table 3).

As usual, the correlation between the average number of likes and followers per day is very high in the case of Facebook (r = 0.999) and positive in the case of Twitter (r = 0.724). The correlation between views and subscribers on YouTube is also very high (r

= 0.934). The correlation data between the number of active social network users in each country and the reception data are only significant in the cases of Facebook likes and followers (r= 0.653 and r= 0.657) and Instagram followers (r = 0.667).

On the other hand, the correlation between the incidence rate and the reception indicators is positive in all cases (from r = 0.46 in the case of the average number of views on YouTube to r = 0.616 in the case of the subscribers to that same network). There is no correlation, however, between these indicators and the mortality rate.

4.4. Transmission-reception ratio

Overall, analyzing the medians of the comparable data (since means are not significant), Facebook generates more likes than Twitter. However, when it comes to followers, Instagram is the most productive network (table 4).

Table 4. *Ratio between posts and reception indicators**

Country	FACEBOOK		TWITTER		YOUTUBE		INSTAGRAM
	Likes / posts	Followers / posts	Likes / posts	Followers / posts	Views / posts	Subscribers / posts	Followers / posts
Australia	28.377	28.582	0.966	2.018	11875.882	9.588	7.292
Brazil	17.106	17.261	0.008	0.281	2244.966	7.310	31.582
Canada	5.424	5.432	0.330	0.535	45248.230	17.213	14.780
China	11.335	11.352	n	n	n	n	n
Costa Rica	4.010	4.074	n	n	n	n	n
Ghana	2.720	2.886	n	n	n	n	n
Indonesia	1.693	1.777	0.005	1.056	109.149	3.149	8.413
Kenya	5.969	6.115	0.591	0.508	n	n	11.885
Malaysia	4.125	4.175	n	n	n	n	n
Malta	3.981	4.074	n	n	n	n	n
Mauritius	24.254	24.535	n	n	n	n	n
Mexico	0.728	0.745	0.202	0.268	55.456	0.176	n
Nigeria	4.848	4.904	n	n	n	n	n
Peru	n	n	n	n	3217.800	12.900	n
Philippines	3.520	3.565	0.124	0.244	n	n	2.028
Saudi Arabia	n	n	0.123	0.450	n	n	n
Senegal	10.955	11.136	n	n	n	n	n
Sierra Leone	8.143	8.169	n	n	n	n	n
South Africa	1.948	1.997	0.129	2.701	123.672	0.281	n
Spain	3.857	4.198	0.111	0.716	n	n	n
Tunisia	13.626	13.788	n	n	42.543	0.286	n
Uganda	1.230	1.254	0.183	0.343	n	n	n
United Kingdom	1051.172	983.872	0.563	3.922	3079.762	2.415	50.093

United States	399.752	386.397	0.086	8.449	3354.168	4.861	59.383
Mean	**73.126**	**69.559**	**0.263**	**1.653**	**6935.163**	**5.818**	**23.182**
Median	**5.136**	**5.168**	**0.129**	**0.535**	**2662.364**	**4.005**	**13.332**

* Data calculated taking into account the average number of posts per day during a year on Facebook and from the beginning of their activity on the other networks, as well as the average of likes, followers, views and subscribers per day on each network.

Source: *author's elaboration*

National data indicate that, in the case of Facebook, United Kingdom and the United States achieve the best like-to-post and follower-to-post ratios, far above the others, whereas Mexico, Uganda, Indonesia and South Africa are at the bottom of that list. On Twitter, the differences between countries are much less noticeable, and while the Australian organization achieves the best ratio of likes per tweet, the United States, the United Kingdom and South Africa are way ahead in terms of number of followers; the worst results correspond to Indonesia when it comes to likes, and to the Philippines and Mexico when it comes to followers. The United States and the United Kingdom are the countries recording the best performance results on Instagram, whereas the Philippines records the worst results (table 4).

Overall, there is no significant correlation between the average number of posts per day and the average number of likes, followers or subscribers, except in the case of Twitter, where this correlation is high ($r = 0.858$ in the case of likes and $r = 0.802$ in the case of followers).

5. CONCLUSSIONS

The present study is based on a sample of organizations from countries on all continents, with different economic development and Internet penetration levels and highly variable breast cancer incidence and mortality rates. Even though there is a certain correlation between social media penetration and network presence, and the organizations from the more developed countries seem to have, in general, an earlier and more varied presence on the online world, case studies are diverse enough to assume that other factors have an influence on these organizations' decision whether to be present or not on social networks.

One of these factors is the disease's incidence, which also seems to correlate to a certain extent with the presence of these organizations on more or less social networks and with their reception results in terms of likes, views, followers or subscribers, although not with the posting frequency. Thus, Australia, the United Kingdom, the United States and Canada, which are four of the five countries with the highest disease incidence, were pioneers in joining social networks and are present on all four most relevant networks, with positive reception results.

The fact remains that, as noted above, breast cancer is mainly a "first-world" disease, and the countries with the highest incidence are also the most technologically developed. Therefore, it is little wonder that mortality rate does not relate to diversity

regarding online presence, nor to activity or reception levels. Indeed, the countries with the highest mortality rates are not those in which the disease has the highest incidence, but others in which, with a few exceptions, early detection and cure processes may be more complex.

With specific regard to the use of each social network, Facebook, with the highest worldwide penetration, is chosen by most organizations to develop their online activities. Moreover, its performance in terms of transmission-reception ratio, with a median of more than 5 likes per post, is quite positive when compared, for instance, with the study by Corbacho-Valencia et al. (2018), in which an average of 2,2 reactions per post is calculated for the most engaging posts published during 2017 Breast Cancer Awareness Month by 21 organizations from the United States, the United Kingdom, Canada and Australia. This implies that, even in the case of organizations with low posting frequency and few followers, these followers are quite loyal and respond positively to the content posted by the organizations, probably due to their high level of involvement.

As for Twitter, despite the fact that its penetration is much lower than that of YouTube or Instagram, half of the organizations remain on it because they created their accounts between 2008 and 2012, during Twitter's boom years; only Uganda joined late, in 2017. However, most organizations, in line with usage trends, have reduced their activity on Twitter and it can be expected that some may eventually close their accounts.

Although YouTube is the second most relevant social network worldwide, its penetration is uneven across countries, which affects the organizations' presence on the video channel. In addition, the activity level of several organizations is quite limited, and so are their reception results.

Regarding Instagram, there are already a few organizations from very different latitudes that have decided to join this network. Instagram is proving to yield good performance results, with an average follower-to-post ratio that doubles that of Facebook; therefore, considering that it is already the third social network in terms of penetration, Instagram seems a good alternative for those organizations wishing to start or increase their online activities.

In view of these results, it would be recommended that organizations focus their efforts on Facebook and Instagram, also using them as a platform for the dissemination of possible audiovisual material that barely reaches views on YouTube.

As a limitation to this study, it should be noted that the reported trends are not particularly significant and that, in some cases, the presence on social networks may depend more on the organizations' will and interest to be active on the online world than on objective factors recommending their presence on networks. For instance, the organizations of Uganda, Sierra Leone and Nigeria are present on Facebook even though Internet penetration rates in these countries reach only 6%, 8% and 12% respectively.

It is true that, in these cases, the posting frequency is low, and the reception results are limited. However, in a continent where the percentage of network users rose from 4% to 17% within a year, and with an upward trend that is expected to continue in the coming years, it is relevant and a very good new that organizations fighting breast cancer, especially in countries with high mortality rates, make such efforts to maintain their online presence.

Although the findings of this descriptive study are not surprising, their importance lies in its broad perspective. Cancer has often been assumed to be a disease that mainly affects the first world, but the mortality rate from breast cancer in underdeveloped or developing countries is high and the incidence rate is increasing. It is therefore relevant to analyze from the field of study of communication the mechanisms and tools that can contribute to the prevention and early detection of the disease, the fund raising for its research and the accompaniment of patients, also in these contexts and not only in countries that already have a high level of communication development.

The expansion of the use of social networks in developing countries makes it possible to rely on their potential as disseminators of information in the short and medium term. For this reason, the mere verification of the efforts that some organizations are already making in this area, as well as the comparison of their activity with entities in developed countries in order to identify their shortcomings and opportunities, is valuable in opening up new avenues of research.

In this sense, a future line of research would be the content analysis of the publications with the greatest impact in these contexts, to detect the possible existence of patterns related to the subject, format or language, similar or different from those usual in the developed countries, that help organizations improve their publications to achieve a greater impact in view of their specificities.

6. REFERENCES

Abramson, K., Keefe, B., Chou, W-Y-S. (2015). Communicating About Cancer Through Facebook: A Qualitative Analysis of a Breast Cancer Awareness Page, *Journal of health communication, 20*(2), 237-243. https://is.gd/OkykUx

Adhikari, J., Sharma, P., Arjyal, L., Uprety, D. (2016). YouTube as a source of information on cervical cancer. *North American journal of medical sciences, 8*(4), 183-186. https://is.gd/t0t6GU

Amadou, A., Torres-Mejía G., Hainaut P., Romieu I. (2014). Breast cancer in Latin America: global burden, patterns, and risk factors. *Salud Pública de México*, *56*, 547-54. https://www.scielosp.org/article/ssm/content/raw/?resource_ssm_path=/media/assets/spm/v56n5/v56n5a22.pdf

Basch, C-H., Basch, C-E., Hillyer, G-C., Reeves, R. (2015). YouTube videos related to skin cancer: a missed opportunity for cancer prevention and control. *JMIR cancer, 1*(1). https://is.gd/A7mEKC

Basch, C-H., MacLean, S-A. (2019). Breast cancer on Instagram: A descriptive study. *International Journal of Preventive Medicine, 10*(1), 166. https://is.gd/JGFM2j

Basch, C-H., Menafro, A., Mongiovi, J., Hillyer, G-C., Basch, C-E. (2017). A Content Analysis of YouTube™ Videos Related to Prostate Cancer. *American Journal of Men's Health, 11*(1), 154-157. https://is.gd/YYVJ8M

Bray, F., Ferlay, J., Soerjomataram, I., Siegel, R-L., Torre, L-A., Jemal, A. (2018). Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: a cancer journal for clinicians, 68(6),* 394-424. https://is.gd/RZnjU6

Clark, E-M., James, T., Jones, C-A., Alapati, A., Ukandu, P., Danforth, C-M., Dodds, P-S. (2018). A sentiment analysis of breast cancer treatment experiences and healthcare perceptions across twitter. https://is.gd/Eniahs

Cooper, C-P., Gelb, C-A., Chu, J. (2016). Gynecologic Cancer Information on YouTube: Will Women Watch Advertisements to Learn More? *Journal of Cancer Education*, *31*(3), 602-604. https://is.gd/MG4huk

Corbacho-Valencia, J-M., Dafonte-Gómez, A., Míguez-González, M-I. (2018). ¿Son útiles los posts de Facebook favoritos de los usuarios para generar públicos informados y activos? Estudio de caso de las organizaciones contra el cáncer de mama. *Revista Internacional de Relaciones Públicas, 8*(15), 177-196. https://is.gd/JV16da

Diddi, P., Lundy, L-K. (2017). Organizational Twitter use: content analysis of tweets during breast cancer awareness month. *Journal of health communication, 22*(3), 243-253. https://is.gd/y1lRji

Fernández-Gómez, E., Díaz-Campo, J. (2016). Comunicación sobre el cáncer en Facebook: Las asociaciones de Argentina, Chile, Colombia y España, *Cuadernos. info,* (38), 35-50. https://is.gd/POzbIH

Hallyburton, A., Evarts, L-A. (2014). Gender and online health information seeking: A five survey meta-analysis. Journal of Consumer Health on the Internet, 18(2), 128-142. https://is.gd/nHzh0W

Hassona, Y., Taimeh, D., Marahleh, A., Scully, C. (2016). YouTube as a source of information on mouth (oral) cancer. *Oral diseases, 22*(3), 202-208. https://is.gd/QDy2JE

International Agency for Research on Cancer & World Health Organization (2020). *Cancer today. Data visualization tools for exploring the global cancer burden in 2018.* https://gco.iarc.fr/today/home

Jiménez-Marín, G., Bellido-Pérez, E., Trujillo-Sánchez, M. (2021). Publicidad en Instagram y riesgos para la salud pública: el *influencer* como prescriptor de medicamentos. *Revista Española de Comunicación en Salud, 12*(1), pp. 43-57. https://doi.org/10.20318/recs.2021.5809.

Kim, E., Hou, J., Han, J-Y., Himelboim, I. (2016). Predicting retweeting behavior on breast cancer social networks: Network and content characteristics. *Journal of Health Communication, 21*(4), 479–486. https://is.gd/TE3u2d

Li, N., Orrange, S., Kravitz, R-L., Bell, R-A. (2014). Reasons for and predictors of patients' online health information seeking following a medical appointment. *Family practice*, *31*(5), 550-556. https://is.gd/n4lRhD

Li, J., Theng, Y-L., Foo, S. (2016). Predictors of online health information seeking behavior: Changes between 2002 and 2012. *Health informatics journal, 22*(4), 804-814. https://is.gd/VD61oF

Madathil, K-C., Rivera-Rodríguez, A-J., Greenstein, J-S., Gramopadhye, A-K. (2015). Healthcare information on YouTube: a systematic review. *Health informatics journal, 21*(3), 173-194. https://is.gd/k3bNTm

Myrick, J-G., Oliver, M-B. (2014). Laughing and crying: Mixed emotions, compassion, and the effectiveness of a YouTube PSA about skin cancer. *Health communication, 30*(8), 820-829. https://is.gd/Dpiyx2

Nastasi, A., Bryant, T., Canner, J-K., Dredze, M., Camp, M-S., Nagarajan, N. (2017). Breast cancer screening and social media: A content analysis of evidence use and guideline opinions on Twitter. *Journal of Cancer Education*. https://is.gd/GSlYqE

Namkoong, K., Shah, D-V., Gustafson, D-H. (2017). Offline social relationships and online cancer communication: effects of social and family support on online social network building. *Health communication*, *32*(11), 1422-1429.

Ponce-de-León-Villafuerte, S., Ferrán-Fernández, Y., Portal-Moreno, R. (2016). El cáncer, un desafío común. De la percepción pública a la responsabilidad social. *Revista de Comunicación y Salud*, *6*(1), 43-54. https://doi.org/10.35669/revistadecomunicacionysalud.2016.6(1).43-54

Ruppert, L., Køster, B., Siegert, A-M., Cop, C., Boyers, L., Karimkhani, C., Winston, H., Mounessa, J., Dellavalle, R-P., Reinau, D., Diepgen, T., Surber, C. (2017). YouTube as a source of health information: Analysis of sun protection and skin cancer prevention related issues. *Dermatology Online Journal, 23*(1). https://is.gd/xbhD5x

Strekalova, Y-A., Krieger, J-L. (2016). A picture really is worth a thousand words: Public engagement with the National Cancer Institute on social media. *Journal of Cancer Education.* Online first. https://is.gd/cRm8N6

Thackeray, R., Burton, S-H., Giraud-Carrier, C., Rollins, S., Draper, C-R. (2013). Using Twitter for breast cancer prevention: An analysis of breast cancer awareness month. *BMC Cancer, 13*(1), 508. https://is.gd/DnyyY3

The Cancer Atlas (n.d.). *Breast Cancer*. https://canceratlas.cancer.org/the-burden/breast-cancer/

Theiss, S-K., Burke, R-M., Cory, J-L., Fairley, T-L. (2016). Getting beyond impressions: An evaluation of engagement with breast cancer related Facebook content. *mHealth, 2*(41), 41. https://is.gd/g3yheB

Vraga, E-K., Stefanidis, A., Lamprianidis, G., Croitoru, A., Crooks, A-T., Delamater, P-L., Jacobsen, K-H. (2018). Cancer and social media: A comparison of traffic about breast cancer, prostate cancer, and other reproductive cancers on Twitter and Instagram. *Journal of health communication, 23*(2), 181-189. https://is.gd/fz23zc

We are social and Hootsuite. (2019). *Global Digital Report 2019.* https://digitalreport.wearesocial.com/

Xu, S., Markson, C., Costello, K-L., Xing, C-Y., Demissie, K., Llanos, A-A. (2016). Leveraging social media to promote public health knowledge: example of cancer awareness via Twitter. *JMIR public health and surveillance, 2*(1), e17. https://is.gd/agn5KD

AUTORES

María Isabel Míguez-González
Profesora titular en la Universidade de Vigo, donde imparte docencia en el Grado en Publicidad y Relaciones Públicas y el Máster Universitario en Comunicación en Medios Sociales y Creación de Contenidos Digitales. Es coordinadora del grupo SEPCOM, de investigación en comunicación para el servicio público y actualmente es investigadora principal del proyecto "Narrativas digitales contra la desinformación. Forma parte del grupo de innovación docente DIXITAIS.
Orcid ID: https://orcid.org/0000-0002-0580-8493

Dra. Silvia García-Mirón
Profesora contratada doctora del Departamento de Comunicación Audiovisual y Publicidad de la Universidade de Vigo. Doctora en Comunicación Audiovisual y Publicidad. Integrante del Grupo de investigación SEPCOM. Ha sido secretaria académica de la Facultad de Ciencias Sociales y de la Comunicación y coordinadora del Máster de Dirección de Arte en Publicidad.

Orcid ID: https://orcid.org/0000-0001-8951-6051

Emma Torres-Romay
Profesora titular en la Universidade de Vigo, donde imparte docencia en el Grado en Publicidad y Relaciones Públicas, el Máster Universitario en Dirección de Arte en Publicidad y el Máster Universitario en Comunicación en Medios Sociales y Creación de Contenidos Digitales. Actualmente es Decana de la Facultad de Ciencias Sociales y de la Comunicación y fue directora del Departamento de Comunicación Audiovisual y Publicidad. Es integrante del grupo SEPCOM, así como del grupo de innovación docente DIXITAIS.
Orcid ID: https://orcid.org/0000-0002-8938-0243