Photoprotection and Skin Cancer on X/Twitter: Analysis of Misinformation, Communication Challenges, and Attitudes in the Spanish Community

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Abstract: This paper delves into the challenges faced by scientists to effectively communicate regarding photoprotection and skin cancer as a result of the pervasive, harmful effects of disinforming messages. In order to do so, the Spanish population's understanding of photoprotection and skin cancer is examined. This paper is as an extension of the COMUNICANCER initiative, the ultimate goal of which is to establish protocols for producing and disseminating accurate content that raises the awareness of skin cancer-related dangers, as well as transferring knowledge on health prevention. Therefore, we have monitored the prevalence of misinformation and lack of information regarding sun photoprotection in Spain, aiming to reflect, ultimately, on the added difficulties faced by the scholarly community to disseminate accurate content in today's communication environment, which has become even more complex due to the distorting influence of disinformation. Employing a quantitative methodology, the research involved a comprehensive analysis of 2498 Spanish-language tweets related to skin cancer and photoprotection collected between August 2021 and August 2022. The study proves that scientists face a social media landscape, particularly on X/Twitter, where there is not only a lack of comprehensive information on the various dimensions of skin cancer, its prevention, and treatment, but which also serves as a breeding ground for the dissemination of inaccurate and misleading information regarding sun-related health risks and preventive measures. This leads to an urgent need to develop strategies aimed at fostering comprehensive and accurate information dissemination, especially regarding health information, due to the critical effect this can have on people and public health systems.

Keywords: science communication; skin cancer prevention; strategic health communication; misinformation; social media

1. Introduction

Skin cancer is the most frequently diagnosed type of cancer according to research by the American Cancer Society (2015). The figures indicate that one in five Americans suffer from skin cancer in their lifetime (Stern 2010), and the global trend is increasing. Skin cancer is differentiated between non-melanomas—basal cell carcinoma and squamous cell carcinoma—and melanomas. Non-melanomas are the most common worldwide, and melanoma, although less prevalent, is the deadliest. In 2020, more than 1.5 million new cases of skin cancers were diagnosed worldwide, with an estimated 325,000 new cases of melanoma and 57,000 deaths (International Agency for Research on Cancer 2022).

Skin cancer affects 7.3 million Europeans (AEDV 2022), with the highest incidence rates in countries such as the Netherlands, Brazil, Iran, and the United States (World Health Organization 2009; Nahar et al. 2018), and remains one of the most prevalent cancers in countries such as Australia (Kasparian et al. 2016). This increase in skin cancer is considered

a growing global public health problem, according to the WHO International Agency of Research Cancer (Nunes et al. 2018; Tabbakh et al. 2019), and an epidemiological situation. In fact, Spain is considered a high-risk context for this disease, due to high solar radiation rates (AEMET 2023). In addition, during the 50th Congress of the Spanish Academy of Dermatology and Venereology (in Spanish, Asociación Española de Dermatología y Venereología), a press release stated that "The incidence of skin cancer has increased by 40% in the last four years. Annually, more than 78,000 new patients are diagnosed, and it is expected that by 2040 melanoma will become the second most common tumor globally. Melanoma is expected to become the second tumor in global incidence in 2040" (AEDV 2023). The severity is such that skin cancer is now considered the second-most prevalent factor of mortality in Global North countries (Sotoudeh et al. 2020).

Yet, skin cancer is one of the most preventable cancers in the world. It is estimated that one third of these cancer cases are preventable, and one third are curable with early diagnosis (Sotoudeh et al. 2020). However, the Spanish Association Against Cancer (Asociación Española Contra el Cáncer in Spanish) reports that 1.5 million patients delay consulting a doctor when they identify suspicious signs of skin cancer and that 33,000 deaths could have been prevented if patients had sought medical help (AECC 2021). In addition, data from the American Cancer Society (2014) indicate that three million cases of skin cancer could be prevented each year if the population were to avoid risk factors associated with ultraviolet (UV) exposure. Thus, skin cancer photoprevention is of essence, as it limits the risks of skin cancer if it is effective; this involves multiple strategies (Tabbakh et al. 2019).

The scenario of steadily increasing skin cancer globally coupled with the effectiveness of photoprotection places skin cancer communication as an alternative to curb this epidemiological crisis. The media, in conjunction with peer pressure and family habits, can significantly influence individual motivation (Sotoudeh et al. 2020; Wu et al. 2018). These sources serve as primary outlets for information among the population, thus playing a pivotal role in shaping health behaviors (Gupta et al. 2019). Nowadays, the importance of social media is crucial both to search for information and to show opinions and attitudes on any subject. Several studies show that the Internet is the most used source to search for information on health and skin cancer (Seidl et al. 2018; Bloom et al. 2015). However, it is essential to recognize the dual role of this network that not only disseminates valuable health information but also, at times, perpetuates inaccurate information that may lead to misinterpretation. In recent years, both institutions (European Commission 2018) and academic researchers (Ferrara 2017; Vosoughi et al. 2018) have highlighted the critical role played by Internet-based networks in the proliferation of misinforming messages. This cross-refers to the critical need to analyze the quality and accuracy of information exchanged on social media platforms, particularly concerning complex health issues, such as skin cancer. Understanding the intricacies of information dissemination and the potential influence of misinformation on social media is imperative in formulating effective communication strategies for the prevention and management of skin cancer.

Amidst this context, it is imperative to gain insights into the unique perspectives and behaviors of the Spanish population regarding this pressing health concern. Spain, like many countries, grapples with the repercussions of an increasing incidence of skin cancer, necessitating a comprehensive understanding of the public's perceptions and attitudes towards photoprotection. Consequently, the aim of this research is to learn about the feelings and attitudes of the Spanish population regarding photoprotection and skin cancer within the framework of the project "Strategic Communication for the Prevention of Skin Cancer Due to Photoexposure to the Sun" (Comunicancer) funded by the Ministry of Science and Innovation. Specifically, this work is based on the premise of the influence that social media can have on health habits, aims to analyze the conversation about photoprotection on social media to find out what is being talked about on the network, and aims to spot potential risks (such as the aforesaid information disorders or the lack of information) that need to be taken into account when targeting massive audiences that need this information. This knowledge will allow us to understand how skin cancer and photoprotection are repre-

sented on social media in order to optimize the effectiveness of prevention communication in this area in the future.

2. Social Media and the Reconfiguration of the Public Sphere

It is hard to remember a world without social media; yet, it has only been present in our lives for two decades. As Al-Deen and Hendricks (2012, p. xv) anticipated, "social media have become an integral part of the contemporary classroom, of advertising and Public relation industries, of political campaigning, and of numerous other aspects of our daily existence". Its impact transcends the borders of traditional mass communication, allowing different actors to become not only mass receivers but also senders who can equally address potential masses. For Hoskins (2013, p. 7), "the enthusiastic adoption of social media" can be easily interpreted, in fact, as a reaction "to the various deficiencies of the commercial, traditional media, rendering it unfit to constitute the architecture for a public sphere". Alongside this possible discontent with traditional forms of mass communication, Falzone et al. (2017, p. S86) add that "the ubiquity of smartphones, social media, and Internet access" led to a structural reconfiguration of the dialectics between mass media and their audiences—which is especially true for younger consumers of content. Thelen and Men (2018, p. 1) add that "many organizations, including higher education institutions and their leaders, have adopted and utilized social media as part of their communication efforts", which certifies an institutional acknowledgement of the predominance of social networks in our everyday life. Villena-Alarcón and Fernandez-Torres (2020, p. 113) also certify that the rule applies beyond the educational and scientific sector: it is difficult to imagine any current remarkable company, anywhere in the world, that has not included social media in its communication strategies. In fact, social media is, frequently, at their core. In this sense, social media has reconfigured the society as a whole—the "latest figures suggest that humanity will spend a combined total of 500 million years using social media in 2024" (Kemp 2024).

Authors such as Tolentino (2019, p. 8) alert, though, of a potentially darker side in this increase in content consumption through new platforms, blaming social media: "where we had once been free to be ourselves online, we were now chained to ourselves online". The functioning of this process that Tolentino (2019) refers to can be explained by what Seymour (2020, p. 64) calls "variable rewards", a system used by "most smartphone apps [...]: you have to pull the lever to see what you're going to get". Seymour (2020, p. 81) also emphasizes that this situation leads to a developed anxiety to keep messages ticked and replied, which he further catalogues as the certification of modern citizenship having changed for good, since users look like "denizens, not citizens, of a machine that keeps us addicted, amid endless boring scrolling" (Seymour 2020, p. 176). Therefore, the impact is not only on how individual receivers consume content nowadays but also on how society as a unit does. With the emergence of the Web 2.0, Shirky (2011) contended that social media would boost the consolidation of the public sphere in both democratic and authoritarian societies. Hoskins added, though, that in doing so, social media had also diluted the boundaries between the public and the private spheres, a process with countless implications. Social media, as a phenomenon, brings along, in the end, a landscape that "is antithetical to the rigid private/public dichotomy essential to Habermas' formulation and thus constitutes a definitive rupture with that tradition" (Hoskins 2013, p. 3).

Audiences that are dependent on social media and the subsequent impact of these technologies on contemporary societies have become central to understanding their current functioning and/or their impact on many fields such as the communication of science. There is an undeniable impact on a large scale, with evident positive sides, though the aforesaid impact can also lead to consequences that are justifiably concerning. In this respect, Iosifidis and Wheeler (2016, p. 69) insightfully write that "trust and accuracy in the news and information produced and disseminated via social media is open to question", which leads to a central question that cross-refers to the research we propose in this paper: acknowledging the ubiquitous impact of social media does not necessarily correlate with

an accurate representation of its contents. This has several implications for different social actors, like scholars, whose commitment to truth and its accurate dissemination, even as an aspirational goal, is central. The task for these actors is, hence, double. On the one hand, understanding the centrality of social media in our contemporary daily life—discussed in following epigraphs—indirectly calls for an unavoidable presence in such digital environments if they want to effectively deliver key messages and findings to large audiences. On the other hand, acknowledging the potential presence of inaccurate narratives is essential to understanding the critical value of resorting to reliable data for these dissemination campaigns.

2.1. The Impact of X/Twitter on the Public Sphere

The specific impact of X (from this moment on, it will be referred to as X) on society has been recurrently discussed in the academic literature since the very beginning of this social network. Authors like Poch et al. (2020) wondered, for instance, about some potential benefits that can be brought along by the microblogging platform, specifically, in the political sphere, by reducing the gap between rulers and their citizenship, hence fostering a less-mediated conversation. Del Valle et al. (2020, p. 211) point out, in this respect, that X can be a mechanism "to surpass traditional journalistic gatekeepers in information provision to the electorate, to converse directly with citizens". This effect was already reported by Parmelee and Bichard (2011), who suggested in the early years of the microblogging platform that it was impossible to understand modern political elections without resorting to X as a mechanism of influence. Former advisor to President Barack Obama, Daniel Pfeiffer, has acknowledged that X played a key role in connecting the electorate with president's ideas (Pfeiffer 2018). His successor in the presidency, Donald Trump, was often referred to as "the Tweeter in Chief" (Parker and Bozeman 2018, p. 398), which seems to confirm a pattern of centrality in the use of X to connect with massive audiences in the public sphere. This raises, though, the question of whether there is an actual conversation between the parties or if it is still just a unidirectional showcase of messages. Gelado-Marcos et al. (2019) note, in this respect, that effective conversation between prominent figures and their followers is far from being a reality, which coincides with the precaution Del Valle et al. (2020) asked for paraphrasing Margetts (2019, p. 116): empirical evidence for such conversation "is both incomplete and inconclusive".

A lack of effective conversation, though, does not bring into question the impact of X on the content consumption habits of modern audiences. In their early research on the role played by X in the public conversation in Spain, Campos-Domínguez and Calvo (2016, p. 230) concluded that "sports information, sensationalism, and soft news in general, are the types of news that generated higher levels of participation". More recent studies, however, seem to expand such impact. Smith and Niker (2021, p. 613) point out, for instance, that X and Facebook have become the main source of information for many, "with internet users spending nearly 2.5 h on average on social media sites each day, and recent Ofcom studies showing that nearly half of the UK population use social media to keep up with the latest news stories".

This cross-refers to the notion of infodemic, a concept that received special academic interest during the COVID-19 pandemic (Cf. García-Marín and Martinrey 2021; Cinelli et al. 2021). It was the director of the WHO himself who declared that "we're fighting an infodemic [. . .]. Fake news spreads faster and more easily than this virus, and is just as dangerous" (Ghebreyesus 2020, cited in Singer 2023, p. 332). The concept was later echoed in various academic publications (cf., for instance, Amoedo et al. 2021; Dafonte-Gómez et al. 2022; or Casero-Ripollés et al. 2023), and Alonso-López et al. (2021, p. 69) specifically summarized the relevance of this notion as a result "of the flood—in the form of a parallel pandemic—of false news and related hoaxes". The danger of an overwhelming quantity of spurious information also goes hand in hand with the lack of information, another hazard that has been pointed out—especially in health emergencies such as the aforementioned COVID-19 pandemic—by authors like Durizzo et al. (2021), who, in their comparative

study of how the pandemic was managed in poor urban neighborhoods of Accra and Johannesburg, found that "a considerable share of the population in both countries still lacks important information".

2.2. Social Media and the Conversation on Cancer Risks and Prevention

X and other social media outlets have indeed branched out to cover a plurality of topics that hint at a massive impact on setting social contexts and on health-related issues. In their research on youth indoor tanning and its risks, Seidenberg et al. (2015, p. 191) recounted, for instance, a campaign launched on social media by the US Center for Disease Control in 2014 "that utilized X and developed three educational posters warning about the dangers of indoor tanning". Such an early precedent shows the fast acknowledgment of the platform as an effective vehicle to reach potentially vulnerable audiences when it came to increasing awareness towards certain diseases such as skin cancer. Jiménez-Sánchez et al. (2023) analyze the content of the photoprevention communication disseminated on Facebook in Spain by the main organizations committed to the promotion of healthy habits in the context of skin cancer. X has also been a vehicle to gather participants for academic research purposes, e.g., by Vollmann et al. (2020), who tested the awareness of cancer and prevention measures by various audiences, or by Jiménez-Sánchez and Moreno (2023), who analyzed the communication on skin cancer prevention that is disseminated on this platform. These research papers indirectly prove the centrality of social media, in general, and X in particular, in the configuration of collective imageries (also associated to representations of cancer and the measures to prevent it). Furthermore, Jiménez-Sánchez and Moreno (2023) state that X, along with Facebook, is the most used platform by skin cancer prevention broadcasters in Spain, but X is more used in the country amongst youth; hence, it is more likely that audiences could have received prevention communication from X.

In 2016, and on the basis of previous research indicating that exposure to traditional media allowed one to predict "skin cancer risk factors in adolescents", Mingoia et al. (2017, p. 1502) proposed an examination of social networking sites (SNSs) to test their influence on "skin tone dissatisfaction, sun exposure, and sun protection among Australian adolescents". In their conclusions, the authors confirmed that "SNS behaviours related to tanning were associated with skin tone dissatisfaction, more frequent sun exposure and less frequent sun protection", indicating that "future skin cancer interventions aimed at adolescents must address the use of SNSs related to appearance" (Mingoia et al. 2017, p. 1514). Coincidentally, in their review on the role of indoor tanning in skin cancer prevention, Falzone et al. (2017, p. S90) agreed that "skin cancer prevention campaigns leverage social media to reach a broader audience".

Falzone et al. advocated, thus, for a social-media-oriented strategy to implement information campaigns aimed at fostering cancer prevention. In this regard, the authors highlighted that with "90% of teens and young adults going online daily and spending an average of almost 9 h per day on social media, prevention campaigns have an opportunity to reach a large proportion of this population, including users of indoor tanning" and that "higher rates of indoor tanning are associated with regular Instagram and X use" (Falzone et al. 2017, p. S88). This led the authors to conclude that "social media represents an underutilized and understudied opportunity for the reduction of skin cancer risk factors, especially among adolescents and young adults—the most active users of social media" (Falzone et al. 2017, p. S91). Similarly, in their examination of cancer risks for the tattoo community and opportunities to enhance cancer prevention, Gonzalez et al. (2020, p. 23) highlight that "tattoo artists turn to social media to enhance their training or to gather ideas and diversify their work", which, for the authors, represents an opportunity "to implement training for tattoo artists and provide skin cancer prevention information to be posted on websites and social media pages".

As social media continues to shape collective perspectives, especially on health-related topics, such as cancer risks and prevention, it is imperative to consider the dynamic nature

of information dissemination within this digital realm. The diverse array of initiatives leveraging platforms like X and other social media channels for health campaigns, as elucidated by the aforementioned studies, underscores the profound influence of these networks in shaping health-related behaviors and attitudes. However, this rapid information dissemination through online platforms has also led to an increase in the circulation of misleading content, raising concerns about the prevalence of misinformation in the context of health communication, particularly regarding skin cancer risks and prevention strategies. The prevalence of disinformation poses a significant challenge in the context of health communication, particularly in the dissemination of accurate and reliable information pertaining to skin cancer risks and prevention strategies. Researchers like Gelado-Marcos et al. (2022) have highlighted the susceptibility of online audiences to misleading content, which indirectly calls for an emphasis on the need to critically evaluate the quality and credibility of information exchanged on social media platforms, including X. This is consonant with studies by other authors like Chen et al. (2021), Seo et al. (2021), or Alonso-López et al. (2021), who have specifically referred to social platforms, such as TikTok, as a network "used mainly by young people who may be more vulnerable to fake news" (Alonso-López et al. 2021, p. 80). This highlights the importance of our investigation into the Spanish population's engagement with photoprotection and skin cancer information, as it seeks to not only understand the prevailing attitudes and perceptions but also to address the potential impact of misinformation on public health behaviors.

3. Materials and Methods

The research was carried out using a quantitative methodology. Traditionally, the study of citizen attitudes and opinions has been carried out using questionnaires or survey data production processes. Authors such as Rinken (2015) and Mendiguren et al. (2020) claim that citizen attitudes and opinions can only be measured indirectly, i.e., by asking respondents to show their position towards certain events or issues. Nonetheless, surveys present biases, such as the fact that the respondent chooses to answer honestly and take the time to respond responsibly (Cinelli et al. 2021). Related to this bias is also social desirability. Depending on variables such as level of education, prior knowledge of the topic, age, or social class, respondents are predisposed to show opinions contrary to their thinking if their position is not socially accepted or politically correct (Gallacher et al. 2021). The social desirability bias is more evident regarding issues such as gender, racism, or the environment because there is greater social polarization (Larson 2019; Fuentes-Lara and Arcila-Calderón 2023), but we also observe it for health issues, e.g., for photoprotection, where society rejects being judged for not protecting themselves from the sun (Galán et al. 2011).

This article bypasses this circumstance by analyzing social media, as it, especially X, allows us to analyze the attitudes and opinions of society by eliminating the biases of social desirability and temporality—having the time and attention to answer—of the survey (Cinelli et al. 2021). Therefore, with the analysis of social media, it is possible to directly measure the attitudes of citizens to a certain issue (Felt 2016), even more so on X, where, more or less anonymously, speeches, opinions, and attitudes can be disseminated on practically any subject (Ekman 2019), including those related to health.

In this quantitative research, the data production technique was the downloading of messages, specifically tweets, from the social network X. The data production was carried out using the X Application Programming Interface (API) in the Academic Research version. This tool allows the downloading of the history of tweets without temporal limitation, only by setting the specific dates on which the search is to be performed (Arcila Calderón et al. 2020). The X API was connected to Google Colaboratory in order to run and program with the Python software. The filters of localization of the tweet—in this case, Spain—and language—in this research, Spanish—were used. This has been one of the main limitations of the data production, since tweets that did not have localization or in which the language was intelligible for the JSON language were downloaded, which considerably reduced the number of tweets.

The tweets downloaded for analysis were issued from August 2021 to August 2022 by Spanish X users. From this timeframe, 2498 tweets that contained one or more of the keywords—see Table 1—and met the time criteria were downloaded.

Table 1. Keywords used in the search for tweets.

Keywords	
#tanning	#skincancer
#cancer	#photoprotection
#melanoma	#photoprevention
#sun	#suncream
#burn	

Source: own elaboration.

After an initial coding in which tweets were eliminated if they were repeated, if they did not correspond to the analyzed topic (using the same keywords but with a different context), if they lacked a logical sense, or if their interpretation depended on a hyperlink or attached images (Arcila Calderón et al. 2020), the final sample was 461 tweets, as shown in Table 2.

Table 2. Valid and invalid tweets.

Valid Tweets		Invalid Tweets	
Frequency	Percentage	Frequency	Percentage
461	18.5%	2036	81.5%

Source: own elaboration.

Once the first coding was performed to extract the relevant tweets, the second coding of the data was carried out. For the coding, two coders who were experts in the subject and familiar with the codebook prepared for the research were trained. The purpose of the training was to avoid possible biases and subjectivities in the interpretation of the tweets (Vrysis et al. 2021). Additionally, in order to ensure the reliability of the measures, an intercoder test was performed on 10% of the initial sample, i.e., 250 messages. The intercoding was performed with all the variables coded, producing values above 0.7 in Cohen's kappa statistic, which is acknowledged as an adequate reliability.

Coding was carried out according to the variables designed prior to data production and categorized in the research codebook. For data analysis, a univariate descriptive analysis (frequency analysis) of the selected variables was performed. The data analysis was performed with SPSS statistical software version 23.

4. Results

In this paper, different variables related to the messages posted by users on social networks about skin cancer prevention and photoprotection were analyzed.

The variables analyzed in this research are the relevance of the message, the objective of the message, the main topic of the post, the causes of the post, the existence of primary and secondary prevention tools for skin cancer and the type of prevention, and the tenure and typology of treatment.

When posting messages about photoprotection and/or skin cancer, X users set the relevance specifically on skin cancer (61.9%), followed by photoprotection (23.8%), and by both topics together (14.3%) (see Table 3).

Practically all the messages are intended to inform (89.6%) about some issue related to photoprotection and/or skin cancer, while 5.4% of the messages seek to express an opinion, and 5% are of a commercial nature. The purpose of the messages is particularly relevant, since they are messages of the user's own elaboration; i.e., all those that are retweets or come from another social media platform have been excluded.

Table 3. Relevance of the message.

Type of Relevance	Percentage
Relevance of skin cancer	61.9%
Relevance of photoprotection	23.8%
Relevance of skin cancer and photoprotection	14.3%

Source: own elaboration.

Regarding the main topic of the post, a little over half of the X users focus on melanoma (50.6%), a greater amount than those that focus on photoprotection (30.1%) and skin cancer in general (17.6%) (see Table 4).

Table 4. Main topic of the publication.

Main Topic	Percentage
Skin cancer in general	17.6%
Melanoma	50.6%
Squamous cell carcinoma	1.1%
Basal cell carcinoma	0.6%
Photoprotection	30.1%

Source: own elaboration.

Most tweets do not allude to the causes of skin cancer (80.8%); only sun exposure is relevant (15.9%). In addition, very few posts mention tanning booths as a cause (0.9%) or other causes, including genetics (2.4%).

Messages referring to both primary and secondary prevention factors are very scarce (Tabbakh et al. 2019; Tizek et al. 2019; García-Montero et al. 2020)—primary prevention amounted to 11.5%, whereas secondary prevention only represented 3%. Primary prevention factors are those referring to protective barriers for UV exposure. These messages are unified in avoiding the use of tanning booths (90%). Secondary prevention factors are those focused on therapeutic care and skin self-examination. These messages focus on the importance of visiting the doctor (56.3%), as can be seen in Table 5.

Table 5. Types of primary and secondary prevention.

Prevention	Tipe	Percentage
Avoid tanning booths	Primary	90.0%
Avoid being outdoors during peak hours	Primary	1.3%
Stay in the shade during peak hours	Primary	0.2%
Wear sunglasses	Primary	0.4%
Use sunscreen	Primary	8%
Seeing a doctor	Secondary	56.3%
Self-check	Secondary	25.0%
Warning signs	Secondary	18.8%

Source: own elaboration.

Regarding treatment, only 6.7% of the messages analyzed refer to skin cancer treatments and photoprotection. Of the different types of treatment, such as biomedical—which would be surgeries, radiotherapy, chemotherapy, immunology, etc.—alternative treatments—such as herbs, foods, etc.—or other types of unspecified treatments, established biomedical treatment were the most prevalent (61.1%) in the tweets.

Summarizing, we can state that the conversation about the second-most prevalent cancer nowadays could be organized into three aspects. The narrative is focused on two prevalent aspects: secondary prevention and primary prevention regarding indoor tanning. However, primary prevention of sun photo exposure is a residual topic. Considering that sun exposure is the main carcinogen factor for skin cancer, these results on the X narrative

demonstrate significant levels of misinformation that can affect the ability of people to perform health-seeking behaviors.

To conclude, it was found that most of the messages were intended to inform about issues related to photoprotection and skin cancer. Only a small percentage of the posts sought to express an opinion or were of a commercial nature. As for the main topic of the post, more than half focused on melanoma, followed by photoprotection and skin cancer in general. These results show the importance that users grant to skin cancer prevention in their posts on social networks.

5. Conclusions

The results of our investigation reinforce, above all, the urgent need to generate more social awareness about skin cancer and the importance of effective sun photoprotection in Spanish society. As it has been observed, the results of this research show that the content on social media, specifically on X—as the social media analyzed in this investigation—is scarce and limited in terms of content diversity. This cross-refers to some of the conclusions observed in the literary review previously summarized in our theoretical framework, which not only warned about the dangers of disinformation but also those derived from the lack of information, which can technically not be labelled as disinforming, but which also do not accomplish the main goal that information has: a reduction in entropy on a given subject. The scarcity of information related to skin cancer found in our research is in agreement with some of the previous findings listed in our literary review, which portrayed X as a network more prone to "soft news"—skin cancer and cancer protection should, rather, be considered as "hard news" due to the obvious scientific implications derived from the nature of this content.

Practically all the tweets analyzed were informative, with very few messages showing attitudes, feelings, or opinions on skin cancer or photoprotection. This result, which, a priori, may seem positive due to the importance of raising awareness through information to society and, even more so, due to our knowledge about the importance of social media for informing about health and skin cancer (Seidl et al. 2018), is not encouraging due to the content of the messages. Although the main topic in half of the analyzed tweets focuses on melanoma and almost one third of the messages focus on sun photoprotection, the content of the messages does not focus on the causes that lead to skin cancer, prevention barriers—primary or secondary—or on treatments for skin cancer.

The main conclusion reached in this research is that despite how seriously skin cancer affects society, this is not a debate that has been transferred to social media in Spain, as can be seen in the fact that only 18.2% of the tweets that contained the words of the research were valid for analysis. In turn, those messages that do address skin cancer and/or sun photoprotection do not address the key issues to create social awareness. This is especially true regarding the need for photoprotection using prevention factors such as primary and/or secondary barriers.

This article started from the premise that social media can exert an influence on health habits and proceeded to analyze the conversation about photoprotection on social media. It should be noted that, although the influence of social media is clear (Bloom et al. 2015), this conversation has not yet been implemented on X. This is especially worrying in the case of Spanish youth since, as much research points out (Wu et al. 2018; Tabbakh et al. 2019), sun photoprotection during youth and adolescence are vital in order not to develop skin cancer.

In summary, greater social awareness and a greater diversity of content on social media is required to address the problem of skin cancer and promote appropriate sun protection.

Finally, it should be noted that the results and conclusions of this research are of vital importance to guide strategic communication on skin cancer and photoprotection, both in associations whose goal is prevention and in the academic world. The systematic study of audiences in the strategic planning process of public relations and their understanding of accurate or incomplete and misleading information is of vital importance to achieve sustainable healthy societies.

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