

COMMUNICATION TO PREVENT SKIN CANCER: AN ANALYSIS OF THE STRATEGIC USE OF THE SOCIAL MEDIA TWITTER IN SPAIN

COMUNICACIÓN PARA PREVENIR EL CÁNCER DE PIEL: UN ANÁLISIS DEL USO ESTRATÉGICO DE LA RED SOCIAL TWITTER EN ESPAÑA

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ABSTRACT

Introduction: Today's society is faced with the unstoppable advance of skin cancer, one of the most common and lethal cancers worldwide. In Spain, its incidence continues to increase in the population and, more incipiently, in young people. This segment of the population is potentially vulnerable to this type of cancer due to the high frequency of exposure to solar radiation without taking preventive measures, and the tanning culture. Educating in photoprotection habits is the best way to reduce the risk of skin cancer. Social media has become essential for raising awareness and promoting healthy behaviours. This study identifies and analyses the communication on skin cancer prevention disseminated on Twitter in Spain by the main strategic issuers involved in this work. **Methodology:** Quantitative content analysis was carried out to determine the first and second levels of agenda-setting communication. For this purpose, 2,486 publications issued on Twitter between April and July 2022 were collected. **Results:** The findings show a predominance of information related to unspecified skin cancer, melanoma and photoprotection, mostly focused on the causes of the disease with sun exposure as the main risk factor. **Conclusions:** In the end, we found an imbalance in the agenda concerning topics and framing that reveals insufficiently optimised communication on Twitter.

Keywords:

Strategic communication; health communication; agenda; social media; Twitter; health; prevention; photoprotection; skin cancer.

RESUMEN

Introducción: la sociedad actual se encuentra ante el irrefrenable avance del cáncer de piel, uno de los más comunes y letales a nivel mundial. En España, su incidencia sigue

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umentando en la población, y de forma más incipiente, en la población joven. Segmento potencialmente vulnerable a este tipo de cáncer por la alta frecuencia de exposición a la radiación solar sin tomar medidas preventivas, y la cultura del bronceado. Educar en hábitos de fotoprotección es la mejor medida para reducir el riesgo de cáncer de piel. Las redes sociales se han convertido en una plataforma esencial para la concienciación y promoción de comportamientos saludables. El presente estudio identifica y analiza la comunicación sobre prevención del cáncer de piel que se divulga en Twitter en España por los principales emisores estratégicos involucrados en esta labor. **Metodología:** se realizó análisis de contenido cuantitativo para determinar el primer y segundo nivel de *agenda setting* de la comunicación. Para ello se recogieron 2486 publicaciones emitidas en Twitter entre los meses de abril a julio de 2022. **Resultados:** los hallazgos muestran predominio de información relativa al cáncer de piel en general sin especificar, el melanoma y la fotoprotección, enfocada mayoritariamente en las causas de la enfermedad con la exposición solar como principal factor de riesgo. **Conclusiones:** al final encontramos un desequilibrio en la agenda respecto a temas y encuadres que revela una comunicación insuficientemente optimizada en la red social.

Palabras clave:

Comunicación estratégica; comunicación de salud; agenda; redes sociales; Twitter; salud; prevención; fotoprotección; cáncer de piel.

1. INTRODUCTION

Public health and society face the constant increase in morbidity and mortality from skin cancer (Chen et al., 2021; WHO, 2022). Particularly among the young population (Heckman et al., 2016), which has high rates of exposure to UV radiation, low levels of preventive behaviors (Fernández-Morano et al., 2016), and a high vulnerability to engage in risky behaviors as seen on social media, such as tanning culture or the use of UV tanning beds (Mingoa et al., 2017; De-la-Garza et al., 2021).

This is why health communication must intervene in the dissemination of misinformation and correct risky behaviors by educating about sun protection (McCloud et al., 2017). Responsible exposure to ultraviolet radiation is the best preventive method for skin cancer (SEOM, 2018; De-Troya-Martín et al., 2019); early diagnosis and treatment also contribute to reducing the risk (Basch et al., 2015).

Previous research shows the existence of a relationship between the agenda set by social media and audience attention to health prevention (Gao et al., 2022; Matthews et al., 2023). Agenda-setting theory starts from the premise that the media have the ability to transfer relevant topics to the public—what to talk and think about—the first level of the agenda (Ardèvol-Abreu et al., 2020). In the context of skin cancer prevention communication, various studies highlight that not all skin cancers have the same representation in social media coverage (Basch et al., 2015; Gomaa et al., 2022). These studies find melanoma as the most frequent central theme among the analyzed content, surpassing basal cell and squamous cell carcinomas. Excessive or insufficient exposure to different types of skin cancers can be problematic due to their varying morbidity and mortality rates (Tang and Park, 2017).

Furthermore, the media are not only capable of transferring to the public an agenda of relevant topics but also how to think about those topics—the second level of the agenda (Ardèvol-Abreu et al., 2020). In the context of health communication, Tang and Park (2017) suggest that media content can be framed in terms of the causes of the disease and the solution. The causes point to the risk factors, in this case, for skin cancer, and the solution encompasses methods to prevent, diagnose, and treat cancer. If a disease is framed as preventable because the causes can be controlled, it is more likely that the public will think in that way about the disease and change their risk behaviors. Various studies demonstrate the relationship between preventive education about skin cancer on social media and the modification of risky behaviors among young people (Falzone et al., 2017; Mingoia et al., 2019; Vasconcelos et al., 2020; Mingoia et al., 2020; Myrick et al., 2022). Likewise, previous research indicates that the factors causing skin cancer, as well as its prevention and treatments, receive little representation in social media content (Tang and Park, 2017; Cho et al., 2018; Vasconcelos et al., 2020; Merten et al., 2022).

Strategic communication in skin cancer prevention is possible on social media (Buller et al., 2021). Due to its extensive reach and relevance, Twitter is playing an increasingly important role in disseminating health information (Vasconcelos et al., 2020), especially among the most active audience on social networks, the youth (Falzone et al., 2017).

In Spain, despite scientific and patient associations conducting some interventions of this nature, skin cancer prevention communication is not effective (Alonso-Belmonte et al., 2022). The content of these campaigns is not appropriately tailored due to previous research not delving into the strategic communication of photo prevention disseminated on social media by official sources specializing in skin cancer. Most of this research has been limited to the study of journalistic communication in often printed media (Cokkinides et al., 2012; Dixon et al., 2014; McWhirter and Hoffman-Goetz, 2015a; McWhirter and Hoffman-Goetz, 2015b), and media coverage of skin cancer on digital platforms (Basch et al., 2015; Tang and Park, 2017; Cho et al., 2018; Vasconcelos et al., 2020; Merten et al., 2022; Gomaa et al., 2022). It is, therefore, essential to address how skin cancer prevention emitters utilize this network. The credibility of the media, particularly government sources, is a determining factor in transferring the agenda to the public (Luo et al., 2019; Matthews et al., 2023). Their credibility will fundamentally determine the presence of intentionally preventive content against skin cancer.

2. OBJECTIVES

Scientific and patient associations also address skin cancer prevention through their social media profiles. However, given the knowledge gap in this field, the general objective (GO) is established: to understand and analyze the content of communication aimed at preventing skin cancer that is disseminated on Twitter in Spain by the main strategic emitters engaged in this task, employing the first and second-level agenda-setting theory.

After reviewing the state of the art in the research subject, the following research questions (RQ) and their corresponding hypotheses (H) related to the first and second-level agenda are proposed.

RQ1. What is the thematic coverage of strategic communication aimed at preventing skin cancer on Twitter in Spain?

RQ2. What are the frames employed in strategic communication aimed at preventing skin cancer on Twitter in Spain?

HI1. The predominant theme in strategic communication aimed at preventing skin cancer on Twitter in Spain is melanoma.

HI2. Strategic communication aimed at preventing skin cancer on Twitter in Spain does not have a frame related to causes.

HI3. Strategic communication aimed at preventing skin cancer on Twitter in Spain does not have a frame related to solutions in terms of prevention, diagnosis, and treatment.

3. METHODOLOGY

The study used a quantitative methodology through content analysis to understand and delve into the subject of study communication.

3.1. Sample design

First, we started with the preliminary identification of the Comunicancer/Compreven(P)cancer project (Comunicancer, 2021) by the most relevant strategic communicators for skin cancer prevention in Spain (Table 1). Their profiles on Twitter were identified, and the posts they made in the previous year were monitored. A higher emission of content was detected during the period between April and July. This finding is consistent since these months are dedicated to prevention campaigns in Spain due to high UV radiation levels and temperatures, coinciding with the summer season and international days for skin cancer and melanoma. Data from the Twitter accounts were collected using the Premium API for developers from the platform. This process followed the guidelines of Cárcamo et al. (2022), ensuring precise and organized data extraction. In this way, 2486 posts were collected.

Each post represented a unit of analysis, considering all its components for subsequent analysis, which could include text, images, videos, and links.

Table 1. *Primary emitters at the national level.*

Emitters.	Twitter followers
Soludable	265
Melanoma España	8100
Área Hospitalaria Costa del Sol (AHCS)	12400
Asociación Española Contra el Cáncer (AECC)	407
Grupo Español Multidisciplinar de Melanoma (GEM)	4335
Centro Nacional de Investigaciones Oncológicas (CNIO)	26300
Asociación Española de Dermatología y Venerología (AEDV)	420

Source: Own elaboration.

3.2. Codification

A first-level analysis was carried out applying a relevance criterion filter. If the publication was not relevant to skin cancer and/or photoprotection, it was discarded for

the next level of analysis. This process allowed determining a total sample of 388 relevant publications for the subject of study, distributed as follows:

Table 2. *Sample distribution.*

Emitters	Number of publications
Soludable	115
AECC	76
AEDV	68
MELANOMA ESPAÑA	66
AHCS	39
CNIO	21
GEM	3
Total	388

Source: Own elaboration.

The sample underwent a second and third level of analysis to determine the first and second level of agenda setting. Prior to this, essential information from the publications was recorded, including the assigned identification number, the publication date, and its objective, which could be informative, persuasive, or commercial. Additionally, it was noted whether it was an original corporate publication or, on the contrary, a repost from another emitter. In the case of a repost, the source was indicated, which could be from other corporate emitters, media outlets, or unidentified authorship. It was coded as unidentified authorship when the reposted publication's source did not belong to any of the two aforementioned categories.

The first level of agenda setting was determined by identifying the main themes of the publications, which included photoprotection, melanoma, basal cell carcinomas, squamous cell carcinomas, and unspecified skin cancer. It is necessary to include photoprotection and examine the publications where it is more prominently addressed since it holds a significant place in the preventive communication of skin cancer at the national level. 'Unspecified skin cancer' was coded when the publication referenced the disease as a whole or various possible themes. The specific theme was coded whenever the publication focused exclusively on one of the themes.

The second level of agenda setting was determined by identifying the cause and solution frames proposed by Tang and Park (2017) and was supplemented by including the tone of the publication (Scully et al., 2008; Tsuda et al., 2016). For this purpose, the following variables were coded:

- Causes: this was determined by recording the cause or causes of cancer identified in the publication, which could include sun exposure, the use of tanning beds, and other causes like genetic factors. The three categories are not mutually exclusive, so a single publication could identify more than one cause of cancer.
- Primary Prevention: firstly, it was recorded if the publication contained information related to primary prevention. If yes, the mentioned prevention methods were identified. The different categories encompass all possible primary prevention methods recommended by the WHO (2022), including avoiding tanning beds, staying indoors during peak hours, seeking shade during peak

hours, wearing long-sleeved clothing, using wide-brimmed hats, wearing sunglasses, and applying sunscreen. The categories are not mutually exclusive, so a single publication could identify more than one primary prevention method.

- Secondary Prevention: the process was the same as the previous variable. The presence of content related to secondary prevention was identified, and the method or methods of prevention present in the publication were coded. These include visiting a doctor, self-checks, and warning signs (ABCD). The categories are not mutually exclusive, so a single publication could identify more than one method of secondary prevention.
- Treatment: this was determined by identifying the skin cancer treatments referred to in the publications. These treatments could refer to established biomedical treatments like chemotherapy, immunology; alternative treatments like the use of herbs, certain foods, etc.; and unspecified treatments. It was coded as unspecified treatments when the publication referenced cancer treatments as a whole. The specific type of treatment was coded whenever the publication focused exclusively on one of the types.
- Tone: the type of tone used in the publication was determined, which could be positive, negative, or neutral. The three categories are mutually exclusive.

3.3. Level of coding confidence

Two coders underwent training on the codebook before the coding process. The coding confidence level was calculated for 10% (n = 39) of randomly selected units of analysis. Using the Holsti Reliability Coefficient (C.R.), the following C.R. value was obtained: C.R. = 0.7952.

3.4. Statistical analysis

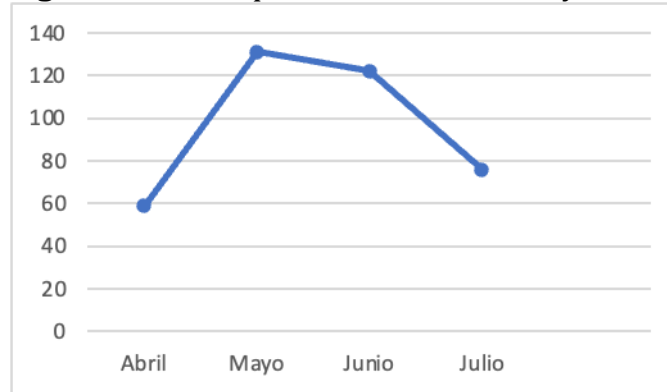
The obtained data were processed using the SPSS statistical analysis software. Frequency distributions and bivariate analyses in contingency tables were conducted, with Pearson's chi-square test, to determine the first and second levels of agenda.

4. RESULTS

4.1. Flow of publications

The present study has focused on the content analysis of the publications by emitters disseminated between April and July 2022, finding the month of May as the peak in the dissemination of content related to photo prevention and skin cancer (Figure 1). This peak emission index gradually declines until the month of July, where the levels are practically equal to the initial coverage in April

Figure 1. Flow of publication emission by month.



Source: Own elaboration.

With regard to the flow of publications on Twitter (Table 3), retweets account for a significant percentage (34%) compared to the total number of original tweets by emitters (66%). Retweets of publications from other corporate emitters were the most frequent (38.7%). Those from unidentified authorship (32.6%) and from media outlets (28.7%) were less retweeted.

Table 3. Flow of publications within the network.

Flows	N	%
Author of the publication		
Original publication	256	66
Republishing	132	34
Total	388	100
Author of the republication		
Media	38	28,7
Other corporate issuers	51	38,7
Unidentified	43	32,6
Total	132	100

Source: Own elaboration.

4.2. Communication agenda

RQ1 monitored the thematic coverage of intentionally preventive communication related to skin cancer on Twitter (Table 4).

The results show a prevalence of content focused on unspecified skin cancer (35.6%), melanoma (34.5%), and photoprotection (28.6%). Conversely, there is limited coverage of non-melanoma skin cancer (1.3%). Based on the frequency distribution analysis results, HI1, which posits melanoma as the predominant theme in communication aimed at preventing skin cancer on Twitter in Spain, is rejected. Unspecified skin cancer is the most recurring theme in communication.

Table 4. *Distribution by theme of publications.*

Topic	N	%
Unspecified skin cancer	138	35,6
Sun protection	134	34,5
Melanoma	111	28,6
Basal cell carcinoma	5	1,3
Squamous cell carcinoma	0	0
Total	388	100

Source: Own elaboration.

4.3. Communication frames

RQ2 monitored the frames used in the subject of study communication, from the perspective of causes and solutions. The analyzed content had a predominant framing of causes (59.3%, n = 230) with a prevalence of sun exposure (57.5%, n = 223) over the use of tanning beds (12.6%, n = 49) and other causes (3.4%, n = 13). The solution frame had a similar frequency between its terms of primary prevention (44.8%, n = 174) and secondary prevention (43%, n = 167). The application of sunscreen (35.1%, n = 136) stood out as a method of photoprotection over the use of wide-brimmed hats (19.3%, n = 75), avoiding outdoor activities during peak hours (16%, n = 62), using sunglasses (15.7%, n = 61), wearing long-sleeved clothing (15.2%, n = 59), staying in the shade during peak hours (12.6%, n = 49), and avoiding tanning beds (9.8%, n = 38). Additionally, as methods of secondary prevention, self-checks (25.8%, n = 100) and seeking medical attention (19.3%, n = 75) predominated over warning signs (ABDC) (11.9%, n = 46). Treatments represented the minority frame from the perspective of disease solution (12.6%, n = 49) through biomedical treatments (12.1%, n = 47) and alternative therapies (0.5%, n = 2). Each publication could mention one or more causes of cancer, prevention methods, and treatments.

The relationship between variables was determined through bivariate analyses in contingency tables with Pearson's chi-square test. The results determined high levels of significance ($p < 0.001$) in associating the framing variables with the communication themes (Table 5). Both content framed in the risk of sun exposure (32.21%, $p < 0.001$) and primary prevention (26.54%, $p < 0.001$) predominantly have a theme of photoprotection. Regarding secondary prevention, publications urging individuals to visit a doctor to check their skin have unspecified skin cancer as the central theme (15.72%, $p < 0.001$). Similarly, publications encouraging individuals to perform self-checks (11.59%, $p < 0.001$) and those addressing treatments (6.7%, $p < 0.001$) have a melanoma theme.

Table 5. Pearson's chi-square on framing and theme variables.

Variables	Skin Cancer	Melanoma	Non melanoma	Sun Protection	p
Causa	18,04 %	8,50%	0,51%	32,21%	<,001*
Sun exposure	17,78 %	7,98%	0,51%	31,18%	<,001*
Tanning beds	4,89%	1,80%	0%	5,92%	,060
Other causes	2,06%	0,73%	0%	0,51%	,231
Primary prevention	12,37 %	5,41%	0,51%	26,54%	<,001*
Avoiding tanning beds	2,31%	2,06%	0%	5,41%	,240
Avoiding the outdoors during peak hours	3,60%	1,80%	0%	10,56%	,421
Staying in the shade during peak hours	2,83%	1%	0%	8,76%	,321
Wearing long pants and long sleeves	4,12%	1,54%	0%	9,53%	,685
Using wide-brimmed hats	5,41%	2,06%	0%	11,85%	,606
Wearing sunglasses	4,12%	1,80%	0%	9,79%	,724
Applying sunscreen	9,79%	4,12%	0,51%	20,61%	,847
Secondary prevention	19,58 %	17,78%	0,51%	5,15%	<,001*
Seeing a doctor	15,72 %	6,44%	0,51%	1,80%	<,001*
Self-examination	10,05 %	11,59%	0%	4,12%	,027*
Warning signs (ABCD)	6,18%	3,60%	0%	2,06%	,242
Treatments	5,92%	6,70%	0%	0%	<,001*
Biomedical	5,67%	6,44%	0%	0%	<,001*
Alternative	0%	0%	0%	0%	
Unspecified	0,25%	0,25%	0%	0%	

*Sig < ,05

Source: Author's own work

As a result of the findings, H12 stating that strategic communication aimed at preventing skin cancer on Twitter in Spain does not have a framing of causes is rejected. More than

half of the analyzed content does indeed present this framing. Conversely, HI3 regarding the solution framing is accepted. Publications with prevention and treatment frames are below average.

4.4. Objective and tone of communication

In order to provide a more comprehensive answer to RQ2, a bivariate analysis was conducted using Pearson's chi-square test to relate the objective and tone used in the communication content (Table 6). In light of the results, both variables are strongly related ($p < 0.006$). A predominantly persuasive approach is obtained, aiming for the adoption of preventive behaviors through the use of a positive tone (28.35%, $p < 0.05$). Informative content ($n = 224$, 29.63%) and commercial content ($n = 139$, 17.52%) were the minority objectives of communication.

Table 6. *Pearson's chi-square on objective and tone variables.*

	Tone			Total	<i>p</i>
	Informativ e	Persuasiv e	Comercia l		
Objective					
Positive	15,72%	28,35%	13,65%	57,73%	
Negative	2,06%	4,12%	0,25%	6,44%	
Neutral	11,85%	20,36%	3,60%	35,82%	
Total	29,63%	52,83%	17,52%	100%	

*Sig < ,05

Source: Author's own work

5. CONCLUSIONS

In terms of publication frequency, it is necessary to highlight the low percentage of posts aimed at raising awareness and reducing skin cancer incidence (15.6%). This is an extremely small percentage out of the total 2486 posts produced during the prevention campaign season on the Twitter accounts of emitters focused on this objective. Additionally, it is noteworthy that within the social network, there is a considerable tendency to repost tweets from other specialized emitters or of unidentified authorship. Content from unofficial sources undermines credibility (Luo et al., 2019) and influence in transferring the agenda to the public (Matthews et al., 2023). Finally, May and June become the hallmark months for prevention communication. This finding is consistent as they coincide with May 23, International Melanoma Day, and June 23, International Skin Cancer Day. Campaigns around these days increase content emission on the network considerably.

In terms of the agenda, the research questions posed at the beginning of the study have been addressed. The predominant theme in strategic communication aimed at preventing skin cancer on Twitter in Spain is unspecified skin cancer, followed by melanoma and photoprotection, with a predominant framing of solar exposure as the cause of cancer and a persuasive approach with a positive tone to encourage the adoption of preventive behaviors.

Basal cell and squamous cell skin cancers are rarely discussed. These results confirm previous studies on skin cancer coverage on social platforms, where melanomas dominate the agenda and carcinomas are nearly nonexistent (Basch et al., 2015; Gomaa et al., 2022). Following the premise of the first level of agenda setting, the media can transfer their agenda to the audience. Therefore, one would expect that a higher prevalence of content about carcinomas on Twitter would generate greater awareness of these cancers among its audience. It is important to note that carcinomas have higher morbidity rates and lower mortality rates than melanomas (Tang and Park, 2017).

Furthermore, the lack of a framing of tanning beds as a cause of cancer on Twitter can have consequences for the young population, who are susceptible to imitating dangerous behaviors they see on social media, such as tanning culture (Mingoia et al., 2017; De-la-Garza et al., 2021). The same applies to the framing of the solution; the results indicate insufficiently focused skin cancer communication on prevention, diagnosis, and treatment of the disease. This finding aligns with previous research on social media, where a lack of framing the solution was found in the analyzed skin cancer communication (Tang and Park, 2017; Cho et al., 2018; Vasconcelos et al., 2020; Merten et al., 2022). Following the assumption of the second level of agenda setting, the media, through their approaches in communication, influence the audience on how to think about a certain topic. The Twitter audience can view skin cancer through cause and solution frames of the disease as a result of greater exposure to information. Increased coverage of skin cancer from causes, prevention, diagnosis, and treatment will make it more likely for the young Twitter population to think in those terms about the disease and modify their behaviors. Skin cancer risk is reduced through primary prevention (SEOM, 2018), early diagnosis, and early treatment (Basch et al., 2015).

Finally, we find an imbalance in the agenda regarding topics and frames, revealing insufficiently optimized communication on the social network. In light of previous literature, Twitter is a key tool in health information dissemination due to its extensive reach and relevance (Vasconcelos et al., 2020), especially among the most active audience on social media, the youth (Falzone et al., 2017). These characteristics make the social network a powerful platform for strategic emitters to conduct their skin cancer prevention communications targeting the young audience.

In view of future lines of research, it is necessary to increase the sample of publications with relevant content on sun protection and skin cancer, covering a variety of different social networks. This would allow for a better understanding of the communication carried out by strategic emitters, comparisons, and obtaining more comprehensive results. It is anticipated that future studies within the framework of the R&D+i project Comunicancer/Compreven(p)cancer will delve into these aspects.

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