Identification of influencers and characterization of the advertising of drugs and dietary supplements on Instagram

Identificación de influenciadores y caracterización de la publicidad de medicamentos y suplementos dietarios en Instagram

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Abstract

Introduction: Social media are a rapid and effective communication tool for product advertising. However, research on social media advertising of pharmaceutical products, such as medications and dietary supplements, is limited. **Objective:** This study aims to characterize the advertising of drugs and nutritional supplements conducted by influencers on Instagram. **Methods:** We employed the influencer marketing platform "StarNgage" and surveyed students and professors to identify influencers. These influencers were then monitored for their Instagram postings. Data collection was facilitated by a Python-developed data scraping bot, which downloaded the influencer-selected posts for subsequent analysis. The advertised products were characterized, and the frequency of advertising appearances was examined; finally, the information was compared with the current regulations in Colombia. **Results:** A total of 28 products were promoted by 42 influencers, including three medications and 25 dietary supplements. Notably, 27 of these products (96.4%) did not adhere to Colombian advertising regulations for such products. Three products (10.7%) had expired health authorization, and the authorization could not be identified for seven products (25.0%). **Conclusions:** This study successfully characterized medication and dietary supplement advertising conducted by influencers on Instagram. Despite relatively infrequent appearances on Instagram, most pharmaceutical product advertising does not comply with Colombian regulations. It can be concluded that drug and dietary supplement advertising on social networks in Colombia lacks specificity for this media and requires regulatory attention.

Keywords: Social networks; Drug advertising; Medicines; Dietary supplements; Rational use of medicines; Self-medication.

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Resumen

Introducción: las redes sociales son una herramienta de comunicación rápida y efectiva para la publicidad de productos. Sin embargo, la investigación acerca de la publicidad de productos farmacéuticos en redes sociales, como medicamentos y suplementos dietarios, es limitada. **Objetivo:** caracterizar la publicidad de medicamentos y suplementos dietarios realizada por influenciadores en Instagram. **Métodos:** se utilizó la plataforma de marketing de influenciadores "StarNgage" y una encuesta dirigida a estudiantes y profesores para identificar un conjunto de influenciadores, a los cuales se les realizó un seguimiento de las publicaciones realizadas en Instagram. Se utilizó un bot de recolección de datos desarrollado en Python, que descargó las publicaciones realizadas por los influenciadores seleccionados, las cuales fueron revisadas. Se caracterizaron los productos publicitados, se analizó la frecuencia de aparición de la publicidad y, finalmente, se contrastó con la normatividad vigente en Colombia. **Resultados:** un total de 28 productos, tres medicamentos y 25 suplementos dietarios fueron publicitados por 42 influenciadores. De ellos, 27 (96,4 %) no cumplieron con la normativa colombiana de publicidad para este tipo de productos. De estos productos, 3 (10,7 %) tenían el registro sanitario vencido y de 7 (25,0 %) no fue posible identificar el registro sanitario. **Conclusiones:** se caracterizó la publicidad de medicamentos y suplementos dietarios realizada por influenciadores en Instagram. La publicidad de medicamentos y suplementos dietarios, a pesar de tener una relativa baja aparición en Instagram, no cumple en su mayoría con la normativa colombiana. Se puede concluir que la publicidad de los medicamentos y suplementos dietarios en redes sociales en Colombia no es específica para este tipo de medio de comunicación y debe ser regulada.

Palabras clave: Redes sociales; Publicidad de medicamentos; Medicamentos; Suplementos dietarios; Uso racional de los medicamentos; Automedicación.

Introduction

Instagram, a social network developed in 2010, has become one of the most popular applications worldwide, especially among teenagers. Emotions and eye-catching posts allow for enhanced social relationships and interpersonal interactions between brands and users, which explains the high levels of user engagement and interaction on the platform[1].

Through these platforms, companies advertise their products in such a way that they influence and modify the consumer habits of the buyer. The positioning of some products in the market through social networks is associated with the activity of influencers, who are responsible for creating digital content and, in turn, direct the consumption of certain products[2]. However, introducing these social networks and advertising pharmaceutical products can generate risk to the population if misused. This situation can be aggravated since regulatory gaps may favor the integrity and evidence of the advertised products being exaggerated. In this context, with the focus on consumer protection, advertising pharmaceutical products —medicines and dietary supplements— on digital platforms should be adjusted to the requirements defined for advertising in other media, such as television example[3,4].

The inappropriate use of over-the-counter (OTC) medications poses risks to public health[5,6]. Since in Colombia, the advertising of OTCs is not regulated in social networks; there is a risk of generating excessive advertising that favors the inappropriate use of these products because of increased consumption associated with the strategic use of social networks and influencers. However, research on the characteristics related to advertising pharmaceutical products on social networks, such as drugs and dietary supplements, is limited. In this sense, this work aimed to characterize the advertising of medicines and nutritional supplements on Instagram and the influencers associated with this type of advertising.

Methodology

A prospective observational study focused on advertising medicines and dietary supplements on social networks, specifically through the exhaustive analysis of publications made by influencers on the Instagram platform. This research approach allows for the effective and timely identification of publications produced by influencers about these products.

The types of content analyzed were those that remain on the profiles of Instagram users, such as photos posted on the profile or short videos (also known as Reels). Temporary content was included as well, such as Instagram Stories, which remain for 24 hours and are deleted after that time. For this reason, a prospective approach was adopted to ensure this type of temporary content was included in the study.

A bot designed in Python was used to capture the information using the "Instaloader" library. The bot automatically collected the data and downloaded and stored all the publications of the selected influencers. This way, the bot collected all the information posted and swept it every hour during tracking time. This ensured that both temporary and permanent posts and the information in their description were stored and could be viewed even if the influencer or the social network deleted them.

A pilot test of the bot was conducted to test its performance. For this, two influencer accounts were randomly selected, and the bot was tested for one week. During this collection period, matching the content published in the influencer's profile with the content automatically collected and stored by the bot was contrasted, and an absolute match was found.

The data obtained by the bot was reported with the date and time of publication along with a text file corresponding to the "caption."

To determine the list of influencers that the bot would follow, a survey was conducted among students and professors of Facultad de Ciencias Farmacéuticas y Alimentarias de la Universidad de Antioquia, who were asked about the influencers they followed on Instagram and related to some content involving pharmaceutical products. In addition to this, the website "StarNgage"[7], an influencer marketing platform, was used. This page contains updated information on the number of influencers' followers and their approximate engagement rate with their followers, which allows us to determine a list of Instagram accounts that generate a high amount of content and interact with their audience. The selected influencers were monitored by reviewing the publications collected by the bot, one by one.

The identified influencers were followed for 30 days, in two seasons, from January 20 to February 20, 2022, for those identified through the marketing platform and from May 13 to June 13, 2022, for those identified through the survey.

Once the results were recorded, a descriptive analysis of the publications was conducted. Likewise, we contrasted whether they complied with the provisions of Resolution 4320 of 2004[8], which regulates the advertising of medicines and phytotherapeutic products sold without a medical prescription (OTC), and the contents of Decree 3249 of 2006[9], which establishes and regulates the advertising and marketing of dietary supplements and Decree 677 of 1995[10], which partially regulates the Regime of Registrations and Licenses, Quality Control, as well as the Regime of Sanitary Surveillance of Medicines and other provisions that allow to appreciate the current regulations defined to advertise pharmaceutical products[11].

The items to verify that the advertising was by Colombian regulations were related to the orientation of correct use of the drug with clear, truthful, and objective language, without using technical terms, without exaggerating or being confusing for the user, that respects free competition and that does not use another product to compare or denigrate it, in addition, this advertising is focused only on adults and the following information is mentioned in written form:

- "It is a medicine."
- "Do not exceed its consumption."
- "Health registration number"
- "Indications and contraindications"
- "If symptoms persist, consult a doctor."

Similarly, dietary supplement advertising is expected to carry the legend: "This product is not intended for the diagnosis, treatment, cure or prevention of any disease and does not supplement a balanced diet."

Finally, the validity of the sanitary registration issued for the pharmaceutical products identified in the publications was verified in the Invima electronic database. Colombian regulations establish that promoting or advertising a drug or phytotherapeutic product must have a validity equal to that of the sanitary registration, so products with expired registration could not be advertised.

Descriptive statistics of quantitative variables were performed to analyze the advertising data identified on Instagram. Frequencies and proportions of nominal or ordinal variables were calculated. Likewise, an analysis was made of the frequency of non-compliance with the regulations on advertising medicines and dietary supplements by influencers on Instagram, considering that 100% compliance is perfect compliance with the laws in Colombia.

Results

The influencers included are the result of the analysis of the information reported in StarNgage (21 influencers) and those identified through the survey of social network users (21 additional influencers). Of the 42 influencers included, 34 (81.0%) were female, with an average age of 35. Of these influencers, 16 promoted a drug or dietary supplement or advertised a product claimed to have beneficial biological or physiological effects in humans. The products identified and the influencers associated with the advertising are presented in Table 1.

In total, 21.8 GB of data were collected; 19,525 files were reviewed, including photos, videos, and text files, collected by the bot during 30 days of tracking the 42 influencers included. From the follow-up, 28 advertised products were identified: 3 (10.7%) medicines: Lemovit C capsules 500 mg and Zinc Oxide cream for topical use (on Instagram Stories) and Metamucil powder for oral reconstitution (permanent publication); and 25 products that fit the concept of food supplement or to which a biological/physiological beneficial effect was advertised.

Table 1. List of products found frequency of occurrence, related influencers, scope and validity of Invima registration.

Product	Frequency of occurrence	Influencer promoting	Date and Type of publication	Total "likes"	Total comments	Invima Sanitary Registration
Lemovit C, capsule, 500 mg Medication	1	Estefanía Borge	20/02/2022 Story	N/A	N/A	Yes (Expired) 3/11/2009
Argel Dietary supplement	5	Tatiana Ángel Pérez (5)	1/02/2022 5/02/2022 7/02/2022 21/02/2022(x2) Story	N/A	N/A	Yes (Valid)
BioSil Dietary supplement	1	Isabel Cristina Estrada Henao	28/01/2022 Story	N/A	N/A	Yes (Valid)
Magic Drops Possible dietary supplement	1	Paola Macias	5/02/2022 Story	N/A	N/A	Not identified
X Burn Possible dietary supplement	1	Paola Macías	5/02/2022 Story	N/A	N/A	Not identified
Burner Stack Food	1	Tatiana Ussa Girardi	25/012022 Permanent	24,398	372	Yes (Valid)
Nutra Stack Food	1	Tatiana Ussa Girardi	1/02/2022 Permanent	2,507	64	Yes (Valid)
Bone Broth Power Food	1	Tatiana Ángel Pérez	8/02/2022 Story	N/A	N/A	Yes (Valid)
Té mingold Food	1	Paola Usme	24/02/2022 Story	N/A	N/A	Yes (Valid)
Nutra C Food	1	Tatiana Ussa Girardi	22/02/2022 Permanent	2,300	40	Yes (Valid)

Product	Frequency of occurrence	Influencer promoting	Date and Type of publication	Total "likes"	Total comments	Invima Sanitary Registration
Zinc oxid, topical cream, Colmed Medication	1	Carolina Cruz	08/05/2022 Permanent	19,554	179	Yes (expired) 2009/07/23
Metamucil, oral reconstitution powder Medication	1	Carolina Soto	11/05/2022 Permanent	2,716	15	Yes (Valid)
Vital Performance Protein Dietary Supplement declared on the package, but without SR	1	Silvia Araujo	18/05/2022 Story	N/A	N/A	Not identified
GAZAP, prebiotic fiber Possible dietary supplement	1	Elianis Garrido	17/06/2022 Permanent	3,130	17	Not identified
GAZAP, green tea and guaraná Possible dietary supplement	1	Elianis Garrido	20/06/2022 Story	N/A	N/A	Not identified
Vitagel Possible dietary supplement	1	Carolina Soto	01/06/2022 Story	N/A	N/A	Not identified
Body Fit Zero Possible dietary supplement	2	La Manu Rayo	22/05/2022 25/05/2022 Stories	N/A	N/A	Not identified
Fi100 Food	1	La Segura	24/05/2022 Story	N/A	N/A	Yes (Valid)
Go Fiber Food	1	Sara Uribe	20/05/2022 Story	N/A	N/A	Yes (Valid)
Té Deluxe Matcha Fit Me, Té Deluxe Lattes Fit Me, Té Deluxe Black Fit Me Food	5	Dani Duke	13/05/2022 (x3) Stories	N/A	N/A	Yes (Valid)
Neuro Food	1	Dani Duke	15/05/2022 Story	N/A	N/A	Yes (Valid)
D3F Food	1	Aida Merlano	18/05/2022 Story	N/A	N/A	Yes (Valid)
Sascha Protein Food	1	Sascha Fitness	02/06/2022 Story	N/A	N/A	Yes (Valid)
Fusion Hydrolyzed Collagen By MuFit Food	1	Aida Merlano	19/05/2022 Story	N/A	N/A	Yes (Valid)
Whey Protein Ultra Gold Food	1	Elianis Garrido	06/06/2022 Permanent	11531	71	Yes (expired) 2016/12/22

Advertising reach

There were 32 posts related to the products of interest; 25 were Instagram Stories, and 2 were featured stories. Seven were permanent posts in the Feed. A total of 66 136 likes and 758 comments were identified for these permanent posts. This information is impossible to collect from Instagram Stories, as it is private.

Frequency of advertising appearances

During the observation period, most of the products studied appeared only once, except for Té Deluxe by Dani Duke, Argel promoted by Tatiana Ángel Pérez, and Body Fit Zero by Manu Rayo.

Compliance with regulations

The characteristics of the advertising were compared with the regulations in force for drugs and dietary supplements. It was found that two of the three drugs had expired Invima registration (Lemovit C and Zinc Oxide). As for the two nutritional supplements, both had current Invima registration. Regarding the advertising characteristics, the drug Metamucil powder for reconstitution, advertised by Carolina Soto, complied with current advertising regulations.

Possible exaggerations of the benefits were identified in the product Lemovit C since the influencer mentions that "it does not damage tooth enamel," there is no evidence showing that vitamin C causes dental alteration. Neither of the two drugs mentioned presents the mandatory legends for drug advertising.

Magic drops, X Burn, Gazap prebiotic fiber, Gazap green tea and guaraná, Vitagel, Body Fit Zero, and Vital Performance Protein are products for which it was not possible to identify the Invima registration with the information, so it was not possible to classify them as drugs, dietary supplements or food. In addition, these products are exaggerated in their advertising; that is, in the case of X burn, it was promoted as a "supplement that contributes to weight loss, thermogenic fat burner, appetite suppressant, and energy enhancer," in the same way, the other products within their benefits referred to provide the body with stimulating substances that allow a correct functioning and even an improvement at an aesthetic level, since some of these products are advertised to reduce cellulite, moisturizers, to improve the elasticity and firmness of the skin.

Regarding the advertising of dietary supplements, there are similar situations; the product Biosil has been approved for use to improve the appearance of nails and hair, and the influencer attributed to it is that it increases the health of joints and bones. It was also found that no dietary supplement has in its advertising the mandatory legend for its commercialization.

Regarding food advertising, exaggerated attributions of Burner, NutraStack, and Nutra C products were found: molders, fat burners, avoid protein degradation, exponentially increase the absorption of creatine in muscle, alleged antioxidant action that helps repair wounds, form tissue, repair and maintain cartilage, bones, teeth and improve defenses. These benefits do not correspond to powdered maltodextrin, glutamine, and artificial flavor preparations. As for the foods, one of them (6.2%), Whey Protein Ultra Gold, was found with an expired sanitary registration.

The tea blends promoted by Daniela Duque were exaggeratedly attributed with certain benefits, including strengthening the immune system, helping to prevent cancer, infections, and cavities, keeping arteries healthy, controlling hypertension, lowering blood sugar levels, managing diabetes, preventing liver fibrosis, and preventing the signs of Alzheimer's —supposedly due to a high content of antioxidants that help eliminate free radicals— improving the appearance of skin and nails, burning fat and aiding weight loss, and naturally satisfying hunger and thirst.

Discussion

In contrast to the research conducted by Llano et al.[12] on compliance with regulations in television advertising of OTC medicines in Colombia in 2018, it was identified that in social networks, there is an increase in the percentage of non-compliance with regulations on advertising these products. These authors found that for 2018, there was a non-compliance figure of 36.2 % corresponding to advertisements broadcast on national channels RCN and Caracol TV on 4 randomly selected days and that this non-compliance was related to non-conformities related to the indication approved by Invima or to the font size of the mandatory legends, where it is worth noting that no total or partial absences of these were reported in any of the broadcasts reviewed. Regarding the results obtained in social networks, it can be seen that in these, there is not such a rigorous control

of compliance with the law compared to the results obtained in television, with 96.4% of non-compliance, especially in the presence of mandatory legends, since in both investigations it can be seen the attribution of effects and uses not approved by Invima for medicines and, in this case, also for dietary supplements.

The actions of influencers in social networks are protected by the fundamental rights to freedom of expression and free development of personality, established in the Colombian Constitution of 19916, which gives influencers freedom of opinion on political, cultural, and social issues, among many others, thus consolidating a significant influence on public opinion, even to the point of becoming a reference for consumers when making consumer decisions. Therefore, digital influencers have the ability and power to inform or give opinions on various topics to many followers without proper regulation during advertising or public opinion, making it difficult to differentiate whether their content is opinion or advertising. This situation can lead to certain damages, in this case to public health, because the consumer trusts that the information presented by these products is truthful and safe, which can, as found in the results, incite incorrect consumption of medicines or dietary supplements. On the other hand, in the case of products registered as food, this type of influence can lead people to think that they can stop taking a drug since how these products are promoted suggests that they can naturally replace the action of a drug to control the disease.

It is also worrying to find advertising of medicines with expired sanitary registration since, in contrast to the legislation in force, the products Lemovit C and Zinc Oxide should have requested the renewal of their sanitary registration at least three months before their expiration when they are no longer in force, they cannot be marketed for any reason, since the stocks in the market could circulate up to a maximum of six months after their expiration. Once this time had elapsed, such products had to be confiscated and disposed of bio-sanitarily. That said, medicines with expired Invima registrations in 2009 were advertised, with presentations and commercial names of products that cannot be marketed. In addition, except for Metamucil, there is a regulatory gap in all publications, evidenced by non-compliance with any desired or expected items for the advertising of drugs and dietary supplements and the lack of use of the mandatory legends. It is also worrying that these products are advertised with exaggerated attributions since the consumer is deceived and induced to buy products for use that are not approved by the regulatory body.

There is a visible need for regulations on this issue, because although television, radio, and press have indeed been the most used media, nowadays, social networks have positioned themselves as an effective strategy to promote various products. For this reason, in addition to monitoring compliance with traditional media advertising on OTC drugs, cosmetics, dietary supplements, and food, it is necessary to carry out a similar process with social networks. Therefore, the issuance of a standard regulating this activity in social networks is required. Still, in addition to the standard, due to the volume of data and the characteristics of the publications, which are mostly temporary and disappear after 24 hours it will be necessary to define, implement, and evaluate the mechanisms for monitoring these publications, the forms of self-regulation and the social control that can be performed, reinforcing education to the population in self-care, with positive influence and public health perspective. Likewise, a differential approach may be required for dietary supplements and foods, aspects that should be studied in future work on this topic.

This research identifies several significant limitations; one is the need for more to determine the actual interaction between people and influencers and the natural and exact number of people who manage to view a story or a post on these influencers' profiles. Additionally, selecting influencers through the StarNgage platform can be limiting, as it is the only tool used, which may introduce bias when selecting study subjects. Another area for improvement was the inability to freely choose non-Colombian influencers since, as publicly known and evidenced through the survey, the content followed by the audience is more than just Colombian. For example, the influencer Sascha Fitness shows that foreign content reaches Colombians' social networks. As a result, many influencers with a large amount of relevant content had to be omitted due to this project's inclusion criteria. It is also worth mentioning the difficulty of not having the promoted products physically available, which makes it impossible to visualize the product presentation and label information properly. This limitation might even be the possible cause of the inability to find the health registrations of the "unidentified products."

In conclusion, influencers' Instagram advertising of medicines and dietary supplements was characterized. Of the 28 advertised products identified, 3 drugs and

25 nutritional supplements, 27 (96.4 %) do not comply with the Colombian advertising regulations expected for this type of products; in addition, 3 (10.7 %) of the advertised products had expired health registration and for 7 (25.0 %) products it was not possible to identify whether they had Invima registration. Despite having a relatively low appearance on Instagram, advertising medicines and dietary supplements must mainly comply with Colombian regulations. It can be concluded that advertising pharmaceutical products on social networks in Colombia is not specific to these types of media and should be regulated.

Authors' contributions

ACAD, SAGM, and MRC drafted the study design, performed the data collection and analysis, and drafted the manuscript. JAHG, JG, and PA contributed to the study ideation, designed the analysis, developed the collection instruments, and participated in the data review. All authors reviewed and approved the manuscript.

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Ethical considerations

The study is risk-free because publicly available information was identified on the Internet[12].

Conflicts of interest

The authors declare no conflicts of interest.

AI technology support

The authors report that they did not use Artificial Intelligence, language modeling, machine learning, or similar technologies to create or assist with the creation or editing of any of the contents of this document.

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