



Digital Social Media and Public Health: Experimental Analysis of the Spread of Medical Pseudoscience on TikTok and Instagram

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Abstract. Today, digital social networks have established themselves as the main sources of information for millions of users. Platforms such as TikTok and Instagram not only entertain, but also shape perceptions about health, science, and well-being. This dynamic poses a challenge for scientific communication, which must adapt to short, visual, and viral formats in order to maintain credibility and impact. A worrying phenomenon is the proliferation of medical pseudoscience: anti-vaccine rhetoric, miracle diets, unproven therapies, and unregulated advice. Spread in attractive formats and by influential figures, they generate confusion and can affect public health, undermining trust in scientific knowledge and institutions. In response to this situation, the L-earn group is proposing experimental research. Its objective is to identify the factors that drive the viral spread of pseudo-scientific content and how users perceive its veracity. The main contribution will be low levels of critical verification, which highlights the need to strengthen media literacy in health. The main contribution will be to design innovative scientific communication tools. L-earn seeks to train young people through interactive applications, educational content adapted to viral formats, and digital campaigns that promote critical thinking and respect for scientific evidence, positioning itself as a benchmark in communication solutions for the digital age.

Keywords: Social media, medical pseudoscience, digital misinformation, public health, media literacy.

1 Introduction

Currently, social media is one of the main means of dissemination. Platforms such as TikTok and Instagram have changed the way people access content, especially when it comes to medical matters, prioritizing speed and entertainment over medical and scientific perception [1]. This has favored medical pseudoscience and misinformation, which tends to have more impact than verified information due to its emotional impact [2, 3].

For this reason, the World Health Organization refers to this as an “infodemic,” pointing out how it negatively affects public health and reduces trust in science [4]. Recent studies indicate that 42% of young people obtain medical information on social media, while up to 87% of health-related content contains unverified information [5–7]. This situation has been described as risky, as it can influence users' decision-making and behavior.

This content has gone viral mainly due to algorithms and interaction metrics, which prioritize more appealing content over scientifically accurate content [8–10]. In addition, psychological factors such as the illusory truth effect increase the credibility of misinformation when it is repeatedly exposed [11]. However, digital literacy has proven to be one of the most effective tools for improving users' ability to identify false information [12].

Nevertheless, there is limited evidence on the dynamics of university students in Ecuador, on the perception of medical pseudoscience on platforms such as TikTok and Instagram, and on the factors influencing its dissemination and credibility.

Therefore, the objective of this study is to analyze the dynamics of medical pseudoscience on these platforms and evaluate its influence on the perceptions of university students. We focus on identifying the most frequent types of pseudoscience, evaluating perceived credibility, analyzing the factors that promote viralization, and proposing strategies based on digital literacy in students.

Finally, to guide the research process, the following research questions are formulated:

- What are the most prevalent medical pseudosciences on TikTok and Instagram, and how real are they for users?
- What digital factors and platform dynamics contribute to the popularization of this pseudoscientific content?
- What educational strategies can be designed to counteract the impact of medical misinformation on public health?

2 State of Art

Analysis of the state of the art in digital health misinformation reveals a convergence between three fundamental dimensions: the growing prevalence of misleading content on social media, the cognitive and algorithmic mechanisms that facilitate its viral spread, and the limited effectiveness of correction and digital literacy strategies. The most representative studies including systematic reviews, computational analyses,

cognitive experiments, and educational interventions provide insight into how platforms such as TikTok and Instagram amplify pseudoscientific narratives, how users process and accept such information, and what factors can mitigate its impact. The following table summarizes the key contributions of seminal and recent works, highlighting their main findings, methods, limitations, and direct relevance to the present project.

Table 1. Summary of key studies related to digital misinformation and health communication.

Author	Main Topic	Methods	Main Findings	Relevance
Suares & Alvarez (2021) [3]	Health misinformation prevalence on social media	Systematic review (JMIR)	Persistent spread of pseudoscientific content without fact-checking mechanisms.	Establishes a global reference for misinformation as a health threat.
Basch et al. (2022) [5]	TikTok and medical misinformation	Quantitative content analysis	Over 60% of health-related videos include inaccurate or misleading data.	Supports focus on visual social media platforms like TikTok and Instagram.
Udry et al. (2024) [10]	Illusory truth effect in social media contexts	Cognitive psychology review	Repetition increases perceived truth even in false statements.	Provides cognitive basis for analyzing user perception and misinformation acceptance.
Cinelli et al. (2021)[13]	Algorithmic amplification of misinformation	Computational and network modeling	Algorithms accelerate the spread of misinformation more than verified information.	Reinforces experimental focus on viralization factors.
Al-Dossary et al. (2024)[12]	Educational interventions for misinformation detection	Experimental intervention (WhatsApp-based)	Short video interventions improved misinformation detection accuracy by 40%.	Basis for L-earn’s proposal of interactive and educational digital strategies.

Over the past five years, digitization has rapidly gained ground worldwide, connecting most of the global population to online information networks. While this new form of information has provided considerable benefits, it has also increased the spread of misinformation, especially when it comes to health information. The World Health Organization states that “infodemics negatively affect health-related behaviors and decision-making,” making misinformation a major public health challenge.[4]

Disinformation as such has been described as an infectious disease due to its spread on social media [1]. Studies suggest that infodemics have patterns characteristic of viral contagion, with digital platforms driving their rapid spread[13]. Social media plays a role in facilitating the circulation of pseudoscientific messages, and due to the lack of

verification mechanisms, it is difficult to discern between evidence and rumors [3, 14, 15].

Audiovisual platforms such as TikTok and Instagram have become prominent channels for misinformation (with a special mention for health). Research shows that most health videos uploaded to TikTok contain information that is inaccurate or has not yet been verified, which is a particular risk factor for young people [5, 16]. Short, emotionally charged videos with aesthetic appeal can even achieve greater virality despite the low quality of their content and lack of medical references, which supports the selection of these platforms for analysis[17–19].

Cognition-centered psychology defines why misinformation is effective. Perception gaps directly influence people's judgments, resulting in an increased tendency to believe inaccurate information [20]. The effect known as illusory truth shows that continued exposure to such information increases perceived credibility but not verified credibility, even in environments without verified sources [10]. The studies reviewed also indicate that familiarity is a determining factor in factual accuracy.[21, 22]

Throughout the process of studying the phenomenon, strategies have been proposed to reduce misinformation through digital literacy. Educational interventions that follow the “form” of the problem, such as short videos inspired by viral content, have improved users' ability to distinguish false information from true information [12]. Other approaches seek alternatives such as “pre-bunking” strategies alongside civic education to reduce the impact of misinformation. Trust in digital networks has also been identified as a determining factor in people's daily health decisions[23–25] .

Studies on digital literacy highlight the importance of taking cultural characteristics into account when dealing with misinformation. Reports from international databases indicate the need to change strategy depending on the region in question, especially in developing countries [26, 27]. Research conducted in the field shows an increase in misinformation during specific times (such as the 2020 pandemic), indicating deficiencies in critical evaluation skills and, once again, supporting the need for specific solutions for each region [28, 29].

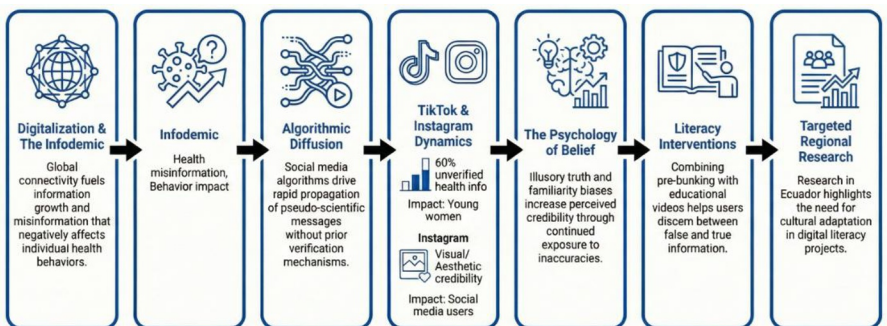


Fig. 1. Conceptual flow diagram of health misinformation in social media

3 Methodology

3.1 Research design

The study adopts a quantitative and correlational design. The approach taken is to analyze the credibility of pseudoscientific medical content disseminated on social media, focusing on TikTok and Instagram among university students, as well as the relationship between digital interaction and credibility.

3.2 Population Sample

The population consists of university students who are active users of TikTok and/or Instagram. The sample size was calculated with a confidence level of 95% and a margin of error of 5%.

$$n = \frac{Z^2 \cdot p(1-p)}{E^2} \Rightarrow n = \frac{(1,96)^2 \cdot (0,5)(1-0,5)}{(0,05)^2} \Rightarrow n \approx 385 \quad (1)$$

- n= sample sizes
- Z=critical value according to confidence level (1,96)
- p=expected proportion (0,5)
- E=margin of error (0,05)

The minimum size required was 385 participants. The final sample consisted of 406 students, ensuring a margin of error of approximately $\pm 4,86\%$. Actual error obtained:

$$E = Z \sqrt{\frac{p(1-p)}{n}} \Rightarrow E = 1,96 \sqrt{\frac{0,25}{406}} \Rightarrow E = 0,0486 \Rightarrow E \approx 4,86\% \quad (2)$$

3.3 Instrument

Data collection was carried out using a Google Forms questionnaire consisting of 13 items divided into four dimensions: social media habits and use, identification of pseudoscientific topics, assessment of perceived credibility, and the magnitude of influence of digital interaction metrics.

3.4 Procedure

Test subjects were invited to complete the survey voluntarily via a digital link or QR code. Informed consent was obtained prior to participation. Data collection was carried out over a period of two months.

3.5 Data Analysis

Specialized software (SPSS or R) was used to perform the statistical analysis. Descriptive statistics, Pearson correlations, t-tests, and multiple regression will be applied.

3.6 Ethical Considerations

Participation was strictly voluntary and anonymous. No personally identifiable information was collected. The study was conducted in accordance with ethical research principles.

4 Results

This study presents the findings of a survey administered to $N = 406$ university students from Yachay Tech and other universities in Ecuador, with the aim of examining the dissemination and perception of medical pseudoscience on TikTok and Instagram.

4.1 Sample Characteristics and Exposure Levels

The sample included participants aged 17 to 55 years (87.2% between 18 and 25 years). The majority reported frequent use of social media for health content (mean Likert ≈ 3.5). Regarding gender ($n = 404$ valid responses), 55.7% identified as female ($n = 225$; 95% CI [50.8%, 60.5%]), 40.3% as male ($n = 163$; 95% CI [35.7%, 45.1%]), and 4.0% as other ($n = 16$; 95% CI [2.4%, 6.4%]).

Participants reported frequent exposure to health content on TikTok and Instagram, with most identifying medical pseudoscience on these platforms, which justifies a detailed analysis of the types observed and their perception of truthfulness.

4.2 Prevalence and Types of Medical Pseudoscience on TikTok and Instagram

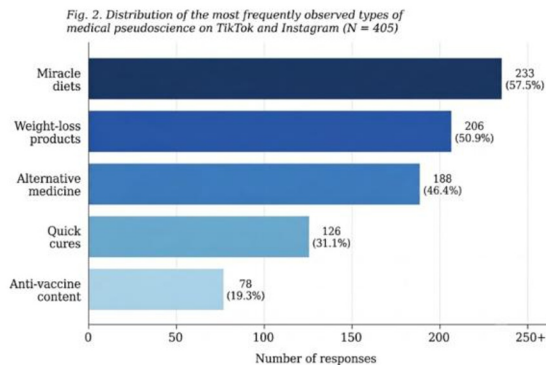


Fig. 2. Distribution of the most frequently observed types of medical pseudoscience on TikTok and Instagram

The most frequently observed types of medical pseudoscience on TikTok and Instagram in this section are miracle diets (233 responses, 57.5%), identified as the predominant phenomenon; followed by weight-loss products lacking evidence (206 responses, 50.9%), alternative medicine without scientific backing (188 responses, 46.4%), quick cures for serious illnesses (126 responses, 31.1%), and, to a lesser extent, anti-vaccine or medical conspiracy theories (78 responses, 19.3%). These survey results highlight that content related to rapid and "miraculous" weight loss (diets and products) is the most frequent and noticeable to respondents, followed by alternative approaches without a scientific basis, while anti-vaccine or conspiracy claims appear less prevalent in their daily perception of the platforms.

4.3 Platform Dynamics and Algorithmic Factors Driving Content Viralization

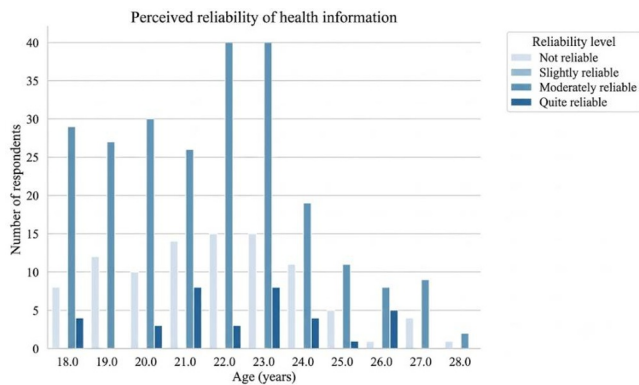


Fig. 3. Factors perceived as most influential in the virality of pseudoscientific content on social media.

The results of a survey conducted among students at Yachay Tech and other universities in Ecuador reveal that recommendation algorithms are the primary driver of the viral spread of pseudoscientific content on social media, with 65.3% (264 responses) of respondents considering them the dominant element, as they promote and sustain prolonged exposure to this material.

This is followed by comments and testimonials in chat rooms (44.1%, 178 responses) and the role of popular influencers (43.6%, 176 responses), which facilitate credibility and rapid dissemination through social interaction and influential figures. To a lesser extent, the lack of regulation or verification (27.2%, 110 responses) stands out, which participants associate with the absence of controls such as requiring professional credentials to address health topics, as well as current music or trends (25.5%, 103 responses), which contribute to an accelerated but secondary expansion of pseudoscience on platforms like TikTok and Instagram.

4.4 Perceived Effectiveness of Educational and Regulatory Strategies

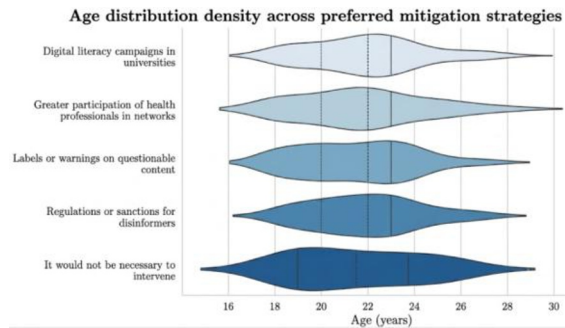


Fig. 4. Strategies considered most useful by participants to reduce the impact of medical pseudoscience.

Content labeling or warnings on dubious content was the most endorsed mitigation strategy (29.6%; 118 respondents), reflecting a demand for greater platform transparency. This was followed by increased participation of health professionals on social media (26.6%; 104 respondents) and digital literacy campaigns in universities (23.6%; 94 respondents). Sanctions or regulations against misinformers received the lowest endorsement (16.7%; 68 respondents). These results indicate that participants favor transparency-based and education-oriented approaches over punitive measures as the most appropriate framework for reducing the impact of medical pseudoscience on social media.

5 Discussion

The survey data collected from 406 Ecuadorian university students reveal that miracle diets and weight-loss products without evidence account for the two most frequently observed categories of medical pseudoscience on TikTok and Instagram, together exceeding 50% of responses. This concentration around body image and physical transformation content suggests that pseudoscientific health messaging on these platforms is primarily driven by aesthetically oriented narratives rather than by overtly ideological or anti-scientific content, as evidenced by the comparatively low prevalence of anti-vaccine or conspiracy-related material (19.3%).

The identification of recommendation algorithms as the primary viralization factor (65.3%) indicates that the structural design of these platforms plays a more decisive role in the spread of pseudoscientific content than individual user behavior. The additional influence attributed to comments and testimonials (44.1%) and popular influencers (43.6%) further demonstrates that social validation mechanisms substantially amplify content reach, reinforcing exposure independently of content accuracy. The comparatively lower weight assigned to lack of regulation (27.2%) and trending music or formats (25.5%) suggests that these factors operate as secondary amplifiers rather than primary drivers of viralization.

The preference for transparency-based strategies over punitive regulation reflects a consistent pattern across all three response categories related to educational and regulatory approaches. Content labeling, scientific participation, and digital literacy together accounted for nearly 80% of respondents preferred strategies, while sanctions received the least support. This distribution suggests that the study population perceives education and platform-level accountability as more legitimate and effective responses to medical misinformation than legal or regulatory enforcement. These findings directly inform the design of evidence-based digital health literacy interventions targeting university students in Latin American contexts.

This study presents limitations that should be considered when interpreting these findings. The sample is restricted to university students, which limits generalizability to broader or less educated populations. The descriptive nature of the analysis does not allow for the establishment of causal or associative relationships between variables; future work should apply inferential statistical methods to examine, for example, whether frequency of social media use correlates with susceptibility to specific pseudoscientific content categories. A longitudinal design would additionally allow researchers to monitor changes in perception and exposure over time.

6 Conclusion

This study examined the perception and dissemination of medical pseudoscience on TikTok and Instagram among 406 Ecuadorian college students. The results show that miracle diets and weight-loss products with no scientific basis are the most common types of content on these platforms. Participants also acknowledged that recommendation algorithms, along with social validation through comments, “likes,” and influencers, played an important role in increasing the visibility and dissemination of this content. Regarding mitigation strategies, respondents expressed the strongest support for prevention and education measures, including promoting evidence-based content, increasing the involvement of health professionals and researchers on digital platforms, and promoting digital health literacy.

Overall, these findings suggest that addressing medical pseudoscience requires a combination of platform transparency and educational initiatives that strengthen users’ ability to critically evaluate online health information. However, the results should be interpreted with caution given the study’s limitations, particularly the use of a convenience sample of college students.

Therefore, the findings cannot be generalized to the general population; future research should include more diverse populations and use probabilistic sampling methods to improve validity and explore in greater depth the relationship between digital engagement mechanisms and the spread of health misinformation.

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References

1. Denniss, E., Lindberg, R.: Social media and the spread of misinformation: infectious and a threat to public health. *Health Promot. Int.* 40, daaf023 (2025). <https://doi.org/10.1093/heapro/daaf023>.
2. Vosoughi, S., Roy, D., Aral, S.: The spread of true and false news online. *Science* (1979). 359, 1146–1151 (2018). <https://doi.org/10.1126/science.aap9559>.
3. Suarez-Lledó, V., Alvarez-Gálvez, J.: Prevalence of health misinformation on social media: Systematic review. *J. Med. Internet Res.* 23, e17187 (2021). <https://doi.org/10.2196/17187>.
4. World Health Organization: Infodemics and misinformation: key findings of the WHO Europe review. WHO Technical Report. (2022).
5. Basch, C.H., Meleo-Erwin, V., Jaime, C., Mongiovi, J., Basch, C.E.: Deconstructing TikTok videos on mental health: Content analysis. *JMIR Form. Res.* 6, e38340 (2022). <https://doi.org/10.2196/38340>.
6. Merga, M.K.: TikTok and digital health literacy: A systematic review. *IFLA Journal.* 51, 490–501 (2024). <https://doi.org/10.1177/03400352241286175>.
7. Bhattacharya, S., Singh, A.: Unravelling the infodemic: a systematic review of misinformation dynamics during the COVID-19 pandemic. *Front. Commun. (Lausanne)*. 10, (2025). <https://doi.org/10.3389/fcomm.2025.1560936>.
8. Corneille, O., Mierop, A., Unkelbach, C.: Repetition increases both the perceived truth and fakeness of information: An ecological account. *Cognition*. 205, 104470 (2020). <https://doi.org/10.1016/j.cognition.2020.104470>.
9. Marín-García, M.D.L. V., Lledó-Carreres, A., Alonso-González, S.: Health Promotion on Instagram: Descriptive–Correlational Study and Predictive Factors of Influencers’ Content. *Int. J. Environ. Res. Public Health.* 19, 15817 (2022). <https://doi.org/10.3390/ijerph192315817>.
10. Udry, J., Barber, S.J.: The illusory truth effect: A review. *Curr. Opin. Psychol.* 54, 101793 (2024). <https://doi.org/10.1016/j.copsyc.2023.101793>.
11. Lewandowsky, S., others: Misinformation and its correction: Continued influence and successful debiasing. *Psychol. Sci.* 31, 243–256 (2020). <https://doi.org/10.1177/1529100612451018>.
12. Al-Dossary, R., others: Educational video intervention to improve misinformation identification on WhatsApp. *JMIR Form. Res.* e50211 (2024). <https://doi.org/10.2196/50211>.
13. Cinelli, M., others: The COVID-19 social media infodemic. *Sci. Rep.* 10, 16598 (2020). <https://doi.org/10.1038/s41598-020-73510-5>.
14. Rodrigues, F., others: The social media infodemic of health-related misinformation. *Patient Educ. Couns.* (2024). <https://doi.org/10.1016/j.pec.2024.107973>.
15. Adebisin, F., others: The role of social media in health misinformation and disinformation: Bibliometric analysis. *JMIR Infodemiology.* 3, (2023). <https://doi.org/10.2196/48620>.
16. Kirkpatrick, C.E., Lawrie, L.L.: TikTok as a source of health information and misinformation for young women. *JMIR Infodemiology.* (2024). <https://doi.org/10.2196/54663>.

17. Sattora, E.A.: Research on health topics communicated through TikTok: Systematic review. *Health N. Hav.* 5, 88 (2024). <https://doi.org/10.3390/health5030088>.
18. Theodorakopoulos, L., Theodoropoulou, A., Klavdianos, C.: Interactive Viral Marketing Through Big Data Analytics, Influencer Networks, AI Integration, and Ethical Dimensions. *Journal of Theoretical and Applied Electronic Commerce Research*. 20, 115 (2025). <https://doi.org/10.3390/jtaer20020115>.
19. Nawaz, F.A., others: Social media use among adolescents with eating disorders: A review. *Psychiatry Res.* 334, 115435 (2024). <https://doi.org/10.1016/j.psychres.2024.115435>.
20. Pennycook, G., Epstein, Z., Mosleh, M., others: Shifting attention to accuracy can reduce misinformation online. *Nature*. 592, 590–595 (2021). <https://doi.org/10.1038/s41586-021-03344-2>.
21. Henderson, E.L., others: Longitudinal study of the illusory truth effect. *J. Cogn.* 4, 161 (2021). <https://doi.org/10.5334/joc.161>.
22. Hassan, A.: The effects of repetition frequency on the illusory truth effect. *Front. Psychol.* 12, 683052 (2021). <https://doi.org/10.3389/fpsyg.2021.683052>.
23. der Linden, S.: Misinformation: Susceptibility, spread, and interventions. *Nat. Med.* 28, 460–467 (2022). <https://doi.org/10.1038/s41591-022-01713-6>.
24. Ishikawa, H., others: Digital health literacy and trust in health information sources. *SSM Popul. Health*. 101844 (2025).
25. Ziapour, A., others: The role of social media literacy in infodemic management: a systematic review. *Front. Digit. Health*. 6, (2024).
26. Darabi, F., others: Digital health literacy and sociodemographic factors among students. *BMC Med. Educ.* 25, (2025).
27. Jiang, J., others: Digital natives: A systematic review of digital health literacy. *Digit. Health*. 11, (2025).
28. Apolo, A., Tusa, F., Roman, M.: FAKE NEWS E INCREMENTO DESINFORMATIVO DURANTE EL ESTADO DE EXCEPCIÓN 2020: CASO EL MERCIOCO, ECUADOR. CHAKIÑAN, REVISTA DE CIENCIAS SOCIALES Y HUMANIDADES. 35–51 (2022). <https://doi.org/10.37135/chk.002.16.02>.
29. Htay, M.N.N., others: Digital health literacy and Covid-19 information among university students. *PLoS One*. 17, e0266276 (2022).

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