

The disinformation virus - Digital quackery as an emerging threat to Ocular and Public Health

O Vírus da desinformação – Charlatanismo digital como ameaça emergente à Saúde Ocular e Pública

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In the current decade, the practice of evidence-based medicine is facing one of its greatest ethical, scientific, and care challenges: digital infodemic¹. The phenomenon of digital quackery, amplified by social media algorithms and the attention economy, has transcended the mere circulation of inaccurate information to become a global public health crisis^{2,3}, with direct and particularly sensitive repercussions in ophthalmology.

Historically, quackery was restricted to local contexts and individuals with limited reach. However, in the contemporary digital environment, influencers, content creators, and self-proclaimed “experts” spread practices without scientific backing at an unprecedented speed and scale, often clad in pseudo-scientific language². Treatments such as “visual healing exercises” for refractive errors, macular degeneration, or hereditary retinal diseases, as well as the indiscriminate use of serotherapies, deworming, or supplements to supposedly “de-inflaminate the optic nerve,” are widely promoted as safe and natural alternatives. This scenario distorts the biological truth and leads to patients abandoning established treatments, such as the regular use of anti-VEGF in retinopathies, strict control of intraocular pressure in glaucoma, or adequate immunosuppression in uveitis, in exchange for promises of miracle cures¹⁻⁴.

An often underestimated aspect of digital quackery is the dangerous direct and indirect interference with prescribed treatments. Many patients do not realize that even supplements labeled as “natural” can severely interfere with therapeutic results. These interferences can not only reduce the effectiveness of the indicated treatments but also potentiate clinically relevant adverse effects.

A representative example in ophthalmology is the indiscriminate use of vitamin A supplements by patients with Stargardt disease. Although vitamin A supplementation has historically been studied in certain retinal dystrophies, it can be deleterious in this condition by accelerating the toxicity of the by-products of the visual cycle and worsening retinal degeneration. However, such

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products continue to be promoted on social media as retinal “protection” or “regeneration” strategies, often without any warning about risks.

A similar situation occurs with ocular surface diseases. Nutritional supplements are playing an increasingly important role in the management of Meibomian gland dysfunction and dry eye disease. However, the proliferation of digitally promoted products without adequate clinical evidence makes it difficult for patients, and even professionals, to determine which formulations are backed by clinical studies and which are based solely on marketing claims.

In this context, it is essential to highlight the official clarifications provided by the National Health Surveillance Agency (Anvisa)⁵ regarding food supplements, which are often promoted in the digital environment as supposed “miracle cures” for eye diseases. Anvisa unequivocally states that food supplements are not medicines and are therefore not intended to treat, prevent, or cure diseases. These products are approved for exclusive use by healthy individuals, with the aim of supplementing the diet by providing nutrients, bioactive substances, enzymes, or probiotics, and do not replace medical treatments or evidence-based clinical interventions.

The misappropriation of these products in digital discourse constitutes not only disinformation but also a potential health violation. By extrapolating the regulatory scope of supplements and attributing curative or preventive properties to them, content posted on social networks and commercial websites leads patients to unrealistic expectations, to abandon proven treatments, and to the indiscriminate use of substances that can negatively interfere with clinical progress.

Anvisa’s clarifications reinforce the need for a clear distinction between products intended for nutritional supplementation and therapeutic interventions validated by clinical studies. In ophthalmology, this differentiation is particularly relevant given the growing complexity of managing chronic and degenerative diseases, wherein adherence to evidence-based approaches is essential for preserving vision and quality of life.

The psychological vulnerability associated with the diagnosis of a serious, progressive eye disease with no curative treatment is fertile ground for spreading false hope⁴. When an individual receives a diagnosis of visual impairment, especially at an advanced stage, there is an understandable desperation that makes any promise of a cure particularly seductive.

This phenomenon occurs in various conditions, such as advanced glaucoma, age-related macular degeneration, hereditary retinopathy, and optic neuropathy.

In this emotional context, simplistic and optimistic messages that are widely disseminated on social networks often override careful medical communication, which is based on probabilities, therapeutic range limits, and longitudinal follow-up. The result can be the abandonment of effective treatments, delays in diagnosis, and the loss of legitimate treatment opportunities, including participation in clinical trials.

Some of the power of digital influencers in the area of health stems from so-called parasocial relationships⁴, defined as one-way emotional connections wherein followers develop a sense of intimacy and trust with people they have never met in person. It is an extremely powerful psychological phenomenon: followers feel they “know” the influencer and come to trust their recommendations as they would a close friend.

This emotional trust can, in certain circumstances, even surpass trust in health professionals who have dedicated decades to scientific training and clinical practice⁶. In the field of ophthalmology, this trust translates into patients relativizing formal medical guidelines in favor of advice obtained from short videos, personal testimonials, or live broadcasts without any commitment to evidence or professional ethics.

The influence of public figures, celebrities, and digital influencers is a particularly important amplifying factor in this scenario. The symbolic authority of these figures, dissociated from technical training or ethical responsibility, leads patients to question or even abandon well-established medical practices. Pseudoscience, in this context, is often cloaked in technical language, out-of-context graphics, and selective quotes from preliminary studies or personal testimonies to create a false sense of scientific legitimacy.

Emblematic cases such as the promises to cure cancer through “natural” diets or products, like the case of Belle Gibson, illustrate well how personal stories can be more compelling than scientific evidence, with potentially devastating consequences. In ophthalmology, similar narratives recur in relation to the supposed “reversal” of blindness, the “regeneration” of the retina, or the “definitive cure” of genetic diseases by means of non-validated methods. These narratives are often disseminated with a strong emotional appeal and devoid of scientific evidence.

More recently, technological sophistication has added a new layer of complexity to the phenomenon of digital charlatanism. The creation of hyper-realistic videos from images of real people has reached a near-cinematic level of fidelity. Deepfake, a technique for synthesizing human images or sounds based on artificial intelligence techniques, allows faces to be changed, voices to be cloned, and even actions to be simulated to perfection. Tools based on artificial intelligence make it possible not only to animate still photographs but also to control specific facial movements, synchronize expressions, and preserve visual identity in a consistent and highly convincing way. In essence, what used to require training, complex tools, and technical knowledge can now be done with a click and a single photo.

These resources are being increasingly used to create and disseminate misleading health content, including videos on websites and platforms that market alternative treatments and make explicit promises of cures for currently untreatable diseases. By simulating testimonies, medical statements, or patient accounts, these productions create an illusion of authority, authenticity, and empirical evidence, making it even more difficult to distinguish between legitimate information and deliberate fraud.

In the context of ophthalmology, this type of content represents a particularly high risk because it exploits the anguish associated with visual loss and appropriates the images of real individuals—sometimes health professionals or patients—to legitimize non-validated interventions. The use of audiovisual manipulation technologies in this context not only broadens the reach of disinformation but also increases its potential for harm by further undermining public trust in science, medical professionals, and institutions.

Recent studies have consistently shown the impact of social media on eye health. Comprehensive reviews on the use of digital media in ophthalmology show its educational potential and its role in disseminating misinformation. In one review, 37 hashtags related to ophthalmology have been shown to yield 723 videos with 3.806 billion views⁶. A minority of videos were created by ophthalmologists (16.9%) and eye health professionals (35.1%), while the majority were created by non-health professionals (55.0%). The most common types of videos were mainly related to personal experiences (35.8%) and education (38.0%). Misinformation significantly correlated with the content created by non-health professionals

($p < 0.001$), and it received a disproportionately higher percentage of likes⁶.

Among the most common myths are the claims that glasses “worsen” vision, blue light causes inevitable damage without specific filters, or marijuana use is an effective preventive strategy for glaucoma. The consequences include the use of potentially harmful products, the postponement of essential treatments, and the gradual erosion of trust in the health system. At the same time, digital and scientific literacy is emerging as an essential strategy in the fight against digital quackery. Empowering the public to recognize reliable sources, understand levels of scientific evidence, and identify potential conflicts of interest is a long-term but absolutely fundamental measure. In this context, ophthalmologists, scientific societies, and medical journals play a strategic role by actively and responsibly occupying the digital space, offering clear, ethical, and evidence-based communication, without compromising the scientific rigor fundamental to medical practice.

The fight against digital quackery^{1,3,8} requires a coordinated and multidimensional response:

Regulation and monitoring. It is imperative that legislation is put forward that makes digital platforms responsible for disseminating content that is harmful to health and that reviews the proportionality of the penalties associated with the crime of quackery, as provided for in Article 283 of the Brazilian penal code.

Digital literacy in health. Today, ophthalmologists must also take on the role of educators. Digital literacy initiatives are essential to enable patients to recognize warning signs, including promises of quick solutions, the absence of side effects, or systematic disqualification of scientific institutions.

Active scientific presence. Medical societies, such as the Brazilian Council of Ophthalmology (CBO) and the American Academy of Ophthalmology (AAO)⁹, must strategically occupy digital spaces with accessible, ethical, and evidence-based content to counter disinformation. In this context, the importance of *eOftalmo* stands out as a bilingual, online journal committed to the competent dissemination of ophthalmological knowledge to the medical community.

Educational content and ethics in communication. Experts recommend that ophthalmologists

produce more evidence-based content to balance the impact of viral information without scientific evidence. Medical advertising, regulated by the Federal Council of Medicine, is not only a physician's right but also a service to society, as long as it is carried out ethically, transparently, and humanely.

Patient-centered clinical approach. In the medical office, the practice of "fact-based corrections" is recommended, along with the identification of the patient's underlying emotions (fear, denial, or despair) that sustain mistaken beliefs. Promoting the understanding of the importance of clinical research and the products developed therefrom is one of the most effective ways to dispel persistent myths.

Ultimately, protecting eye health requires more than diagnostic precision and surgical excellence. It demands the uncompromising defense of scientific integrity in the face of digital opportunism. Without the ability to discern truth from falsehood, patients are unable to recognize products and treatments with proven efficacy amidst a sea of unfounded claims.

Just as important as developing new treatments is ensuring that patients have access to those treatments that have been shown to be beneficial, and not be diverted by empty promises that cost precious treatment time and, often, sight and life itself.

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