

Medical Misinformation on Social Media and Its Impact on Public Health Campaigns: A Global Review of Challenges, Determinants, and Communication Strategies

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ABSTRACT

Medical misinformation disseminated through social media has become a major global public health challenge, influencing health behaviors, public trust, vaccination acceptance, and the effectiveness of health communication strategies. The rapid expansion of digital platforms has facilitated unprecedented access to health information while simultaneously increasing exposure to inaccurate, misleading, and scientifically unsupported content. This review aimed to analyze

the global impact of medical misinformation on public health campaigns and identify evidence-based strategies capable of mitigating its effects. A structured review of scientific literature was conducted using publications indexed in major international databases, including PubMed, Scopus, Web of Science, and ScienceDirect. The evidence examined demonstrated that misinformation significantly affects vaccination programs, adherence to preventive measures, trust in healthcare institutions, risk perception, and healthcare-seeking behaviors. Vaccine-related misinformation emerged as the most prevalent category, followed by false preventive recommendations, conspiracy theories, unsupported treatments, and misleading information regarding infectious diseases. Social media platforms such as Facebook, WhatsApp, YouTube, TikTok, and X were consistently identified as major channels for misinformation dissemination. Evidence from Latin America, including Mexico, Colombia, and Ecuador, revealed patterns similar to those observed globally, although local sociocultural and educational factors influenced vulnerability and response capacity. The literature further highlighted digital health literacy, fact-checking initiatives, institutional communication, healthcare professional engagement, and accuracy-promoting interventions as effective approaches for reducing misinformation-related harms. The findings emphasize the need for multidisciplinary collaboration and sustained investment in evidence-based communication strategies to strengthen public trust, improve health literacy, and enhance the effectiveness of future public health campaigns.

KEYWORDS

Medical misinformation, Social media, Public health campaigns, Health communication, Infodemic, Vaccine hesitancy, Digital health literacy, Infectious diseases, Public health, Health education, Fact-checking, Vaccination, Risk perception, Digital communication, Global health

INTRODUCTION

The rapid expansion of digital communication technologies has transformed the way health information is produced, distributed, and consumed worldwide. Social media platforms such as Facebook, X (formerly Twitter), Instagram, TikTok, YouTube, and WhatsApp have become primary sources of health-related information for millions of individuals, offering immediate access to medical knowledge, public health recommendations, and disease prevention strategies. While these platforms have facilitated unprecedented opportunities for health promotion and public engagement, they have simultaneously enabled the rapid dissemination of misinformation and disinformation, creating a complex global public health challenge [1], [2].

Medical misinformation can be defined as health-related information that is false, inaccurate, misleading, or unsupported by the best available scientific evidence. In contrast, disinformation refers to intentionally deceptive content created and disseminated to mislead audiences. Both phenomena have contributed significantly to what the World Health Organization (WHO) has termed an “infodemic,” characterized by an overabundance of information, including false or misleading content, that complicates individuals’ ability to identify trustworthy sources and make informed health decisions [2], [20]. The consequences of this phenomenon have become increasingly evident during major public health emergencies, particularly during the COVID-19 pandemic, where misinformation circulated at unprecedented speed and scale across digital platforms [3], [4].

The influence of medical misinformation extends beyond individual beliefs and behaviors, affecting healthcare systems, public trust in scientific institutions, vaccination campaigns, disease prevention programs, and governmental health policies. Several studies have demonstrated that exposure to misinformation can reduce adherence to evidence-based preventive measures, increase vaccine hesitancy, and undermine confidence in healthcare professionals and public health authorities [3], [5], [7]. In many cases, false health narratives have spread more rapidly than scientifically validated information due to their emotional appeal, simplicity, and capacity to generate engagement through social media algorithms [6].

The COVID-19 pandemic provided a unique opportunity to examine the large-scale effects of misinformation on public health interventions. Research conducted in multiple countries revealed that exposure to false claims regarding vaccine safety, efficacy, and development processes significantly reduced vaccination intentions among different populations [3]. Similarly, international investigations found considerable variability in susceptibility to misinformation, influenced by demographic characteristics, educational levels, political beliefs, media consumption habits, and digital literacy skills [4]. These findings highlight the multifactorial nature of misinformation and emphasize the need for comprehensive public health strategies capable of addressing both informational and behavioral determinants.

Recent literature has identified social media platforms as major facilitators of misinformation dissemination. TikTok, Facebook, YouTube, and messaging applications have been repeatedly associated with the circulation of misleading content related to vaccines, infectious diseases, nutrition, chronic illnesses, and alternative medical treatments [10], [12], [13]. The viral characteristics of these platforms allow inaccurate information to reach large audiences within short periods, often surpassing the visibility of content generated by scientific institutions or healthcare organizations. Furthermore, recommendation algorithms may amplify sensationalist content, reinforcing misinformation exposure through personalized information ecosystems [6].

The global impact of medical misinformation is particularly relevant in the context of vaccination campaigns. Vaccine hesitancy has emerged as one of the most significant threats to public health, with misinformation playing a central role in shaping negative attitudes toward immunization programs [7], [8]. Studies conducted across North America, Europe, Latin America, Africa, and Asia have consistently reported associations between misinformation exposure and reduced vaccine acceptance rates [3], [15], [18]. During the COVID-19 vaccination campaigns, false narratives regarding adverse effects, infertility risks, microchip implantation, and conspiracy theories contributed to delays in vaccine uptake and hindered efforts to achieve population-level immunity [10], [11].

Latin America represents a particularly important region for studying the effects of health misinformation due to its high social media penetration rates, diverse healthcare systems, and significant digital inequalities. Research conducted in several Latin American countries has demonstrated that misinformation has influenced public perceptions regarding infectious diseases, vaccination programs, and governmental health interventions [14], [17]. In Mexico, concerns have been raised regarding the impact of false health information on vaccine confidence and public adherence to preventive measures during infectious disease outbreaks [16]. Similar patterns have been observed in Colombia, where misinformation has affected risk perception and public trust in health authorities, while studies conducted in Ecuador have highlighted the challenges associated with digital information quality and health communication during public health emergencies [17]. These regional experiences illustrate how misinformation transcends national boundaries and requires coordinated responses involving governments, healthcare institutions, academic organizations, and civil society.

The growing recognition of misinformation as a determinant of health outcomes has prompted increased academic interest in identifying effective mitigation strategies. Emerging evidence suggests that interventions focused on improving health literacy, digital literacy, fact-checking mechanisms, and critical thinking skills may reduce susceptibility to misinformation [8]. Additionally, studies have demonstrated that relatively simple interventions, such as encouraging individuals to consider information accuracy before sharing content online, can significantly decrease the dissemination of false information [5], [6]. These findings indicate that both individual-level and systemic approaches are necessary to address the challenges posed by health misinformation.

Despite the growing body of literature, important knowledge gaps remain regarding the mechanisms through which misinformation affects public health campaigns, particularly across different sociocultural contexts. Existing studies vary considerably in methodology, target populations, and outcome measures, making it difficult to establish a comprehensive understanding of the phenomenon. Furthermore, the rapid evolution of digital platforms continuously generates new channels for misinformation dissemination, requiring ongoing evaluation and adaptation of public health communication strategies [1], [2].

Given these considerations, the present review aims to analyze the global impact of medical misinformation disseminated through social media and examine its effects on public health campaigns, with particular attention to vaccination initiatives, infectious disease prevention programs, and health communication strategies. The review also explores evidence from Latin America, including Mexico, Colombia, and Ecuador, in order to identify regional challenges and opportunities for strengthening public health responses. The central research question guiding this study is: How does medical misinformation disseminated through social media influence the effectiveness of public health campaigns, and what evidence-based strategies can mitigate its impact?

To address this question, a structured review of scientific literature was conducted using peer-reviewed publications indexed in internationally recognized databases. The methodological design was selected to synthesize current evidence, identify recurring themes, compare findings across geographic regions, and evaluate intervention strategies reported in the literature. By integrating global and regional perspectives, this review seeks to contribute to a better understanding of the relationship between misinformation, digital communication, and public health outcomes, while providing evidence that may support future health communication policies and interventions.

DEVELOPMENT

The digital transformation of healthcare communication has fundamentally altered the way individuals access, interpret, and share medical information. Over the last two decades, social media platforms have evolved from interpersonal communication tools into major channels for health education, disease prevention campaigns, and public health promotion. Platforms such as Facebook, Instagram, TikTok, X (formerly Twitter), YouTube, and WhatsApp collectively reach billions of users worldwide, allowing health-related content to spread rapidly across geographic, cultural, and socioeconomic boundaries [1], [2].

While this digital ecosystem has facilitated broader access to health information, it has simultaneously increased exposure to misinformation. The WHO has identified health misinformation as one of the most significant challenges facing contemporary public health systems because inaccurate information can influence individual behaviors, shape public perceptions, and undermine evidence-based interventions [2], [20]. Unlike traditional media, social media platforms permit virtually unrestricted content creation, enabling individuals without scientific expertise to generate and disseminate health-related information that may reach audiences comparable to or even larger than those of official health institutions.

Research indicates that misinformation often spreads more rapidly than scientifically verified information because it tends to evoke stronger emotional responses and greater user engagement [6]. Sensational claims regarding diseases, treatments, vaccines, and public health interventions frequently attract more attention than evidence-based recommendations. Consequently, misinformation can become deeply embedded within digital communities before corrective information becomes available.

The problem is further exacerbated by algorithmic recommendation systems designed to maximize user engagement. These systems frequently prioritize content based on popularity rather than scientific accuracy, unintentionally amplifying misleading narratives and creating information environments where users are repeatedly exposed to similar viewpoints. Such mechanisms contribute to the formation of digital echo chambers that reinforce preexisting beliefs and reduce exposure to reliable scientific information [6].

Medical Misinformation as a Public Health Threat

Medical misinformation has evolved from an informational concern into a measurable public health risk. Numerous studies have demonstrated associations between misinformation exposure and adverse health outcomes, including reduced adherence to preventive measures, increased vaccine hesitancy, delayed healthcare seeking behavior, inappropriate self-medication practices, and diminished trust in healthcare professionals [3], [7], [8].

One of the most concerning consequences is the erosion of trust in scientific institutions. Public confidence is a critical determinant of successful health interventions. When misinformation challenges the credibility of healthcare providers, researchers, regulatory agencies, and governmental institutions, public compliance with evidence-based recommendations may decline significantly. This phenomenon became particularly evident during the COVID-19 pandemic, when misinformation campaigns targeted scientific organizations and questioned the legitimacy of public health measures [3], [4].

The impact extends beyond individual decision-making. At the population level, misinformation can compromise disease control efforts by reducing participation in screening programs, discouraging adherence to preventive measures, and increasing resistance to vaccination campaigns. Such effects may ultimately contribute to higher morbidity and mortality rates, increased healthcare expenditures, and prolonged public health emergencies [2], [14].

Furthermore, misinformation disproportionately affects vulnerable populations characterized by limited health literacy, restricted access to healthcare services, lower educational attainment, or reduced digital literacy skills. These populations may face greater challenges in distinguishing reliable information from misleading content, thereby increasing their susceptibility to misinformation-related harms [8].

Social Media Platforms and the Dynamics of Information Dissemination

The architecture of social media platforms plays a central role in determining how health information circulates. Unlike traditional communication models, digital platforms enable immediate content sharing, user-generated communication, and real-time interaction among large audiences. These characteristics facilitate rapid information diffusion but also create favorable conditions for misinformation propagation [10], [13].

Several studies have documented the widespread presence of inaccurate health information across major social media platforms. TikTok has been identified as a significant source of misleading content related to vaccination, nutrition, dermatology, and chronic disease management [13]. Similarly, YouTube has hosted videos containing unsupported medical claims that have accumulated millions of views, while Facebook groups and messaging applications have facilitated the viral spread of conspiracy theories and pseudoscientific narratives [10], [12].

The emergence of influencers and non-expert content creators has further transformed health communication dynamics. Many individuals obtain health advice from social media personalities whose credibility is often based on popularity rather than scientific qualifications. While some influencers contribute positively to health education, others unintentionally or deliberately disseminate inaccurate information that may conflict with established medical evidence [1], [12].

Additionally, misinformation campaigns frequently employ emotionally charged language, anecdotal experiences, and visually appealing content to increase engagement. These communication strategies can make misinformation more persuasive than traditional evidence-based messaging, particularly among audiences lacking advanced scientific literacy [6].

Impact on Vaccination Campaigns and Infectious Disease Control

Vaccination programs represent one of the areas most affected by health misinformation. Vaccines have historically been among the most effective public health interventions, preventing millions of deaths annually. Nevertheless, misinformation has contributed substantially to vaccine hesitancy across multiple regions of the world [7], [15].

The COVID-19 pandemic highlighted the vulnerability of vaccination campaigns to misinformation. False narratives claiming that vaccines caused infertility, altered genetic material, contained microchips, or produced severe long-term

health consequences circulated extensively across social media platforms [10], [11]. These claims often lacked scientific evidence but nevertheless influenced public perceptions and vaccination intentions.

Experimental studies conducted in the United States and the United Kingdom demonstrated that exposure to misinformation significantly reduced willingness to receive COVID-19 vaccines [3]. Similar findings have been reported across Europe, Asia, Africa, and Latin America, indicating that misinformation constitutes a global determinant of vaccine acceptance [15], [18].

The consequences extend beyond COVID-19. Misinformation has also affected public perceptions regarding measles, human papillomavirus, influenza, and childhood immunization programs. Declining vaccination rates may facilitate the reemergence of preventable diseases, threatening decades of progress achieved through immunization initiatives [7].

Public health authorities increasingly recognize that successful vaccination campaigns require not only vaccine availability but also effective communication strategies capable of addressing misinformation and restoring public confidence. This shift underscores the importance of integrating communication science into infectious disease control programs [8].

The Latin American Perspective: Mexico, Colombia, and Ecuador

Latin America offers a particularly relevant context for examining the relationship between social media misinformation and public health outcomes. The region has experienced rapid digital expansion, increasing internet penetration, and widespread adoption of social networking platforms. Simultaneously, significant inequalities in education, healthcare access, and digital literacy persist, creating conditions that may facilitate misinformation dissemination [14].

In Mexico, studies have identified substantial circulation of misinformation related to COVID-19, vaccination, and preventive health measures. False claims disseminated through social media and messaging applications contributed to uncertainty regarding vaccine safety and effectiveness, influencing public attitudes toward immunization programs [16]. The Mexican experience illustrates the challenges faced by health authorities attempting to communicate scientific information within highly dynamic digital environments.

Colombia has similarly confronted misinformation-related challenges during infectious disease outbreaks. Research suggests that misinformation influenced risk perception, public trust in institutions, and adherence to preventive recommendations. Digital communication strategies implemented by Colombian health authorities have emphasized fact-checking initiatives, community engagement, and evidence-based messaging to counter misinformation [14], [17].

In Ecuador, public health communication efforts during recent health emergencies revealed both opportunities and limitations associated with digital media. While social media facilitated rapid dissemination of health recommendations, it also enabled the circulation of rumors, conspiracy theories, and inaccurate medical advice. These experiences highlighted the need for stronger digital health literacy initiatives and more effective monitoring of misinformation trends [17].

Collectively, the experiences of Mexico, Colombia, and Ecuador demonstrate that misinformation is not merely a technological issue but also a social, educational, and institutional challenge requiring multidisciplinary responses.

Strategies to Counteract Medical Misinformation

Addressing medical misinformation requires interventions at multiple levels, including individuals, healthcare systems, governments, academic institutions, and technology companies. Current evidence suggests that no single strategy is sufficient to eliminate misinformation; instead, comprehensive approaches are necessary [2], [8].

Health literacy and digital literacy programs represent foundational interventions. Individuals who possess stronger critical appraisal skills are better equipped to evaluate the credibility of online information and identify misleading content. Educational initiatives targeting students, healthcare professionals, and the general public have demonstrated positive effects on information evaluation capabilities [8].

Fact-checking systems constitute another important strategy. Independent verification organizations, scientific institutions, and public health agencies increasingly collaborate to identify and correct false claims circulating online. Timely correction of misinformation can reduce its influence, although corrective messages are often less likely to spread than the original misinformation [5].

Recent research has also demonstrated the effectiveness of “accuracy nudges,” interventions that encourage users to consider the accuracy of information before sharing it. Such approaches have been shown to reduce the dissemination of misinformation without restricting freedom of expression [5], [6].

Healthcare professionals play a critical role as trusted sources of information. Strengthening communication skills among healthcare workers can improve patient education and enhance public confidence in scientific recommendations. Likewise, partnerships between healthcare institutions and social media platforms may facilitate broader dissemination of evidence-based health content [7].

GENERAL OBJECTIVE AND SPECIFIC OBJECTIVES

To analyze the global impact of medical misinformation disseminated through social media and evaluate its effects on public health campaigns, infectious disease prevention strategies, vaccination programs, and health communication initiatives, with particular consideration of evidence reported in Mexico, Colombia, Ecuador, and other international settings.

A. Cognitive Domain

1. Remembering

To identify the principal forms, sources, and dissemination mechanisms of medical misinformation reported in social media platforms according to contemporary scientific literature.

2. Understanding

To explain the relationship between health misinformation, public perception, health behaviors, and the effectiveness of public health campaigns across different populations and geographic regions.

3. Applying

To examine how evidence generated from international studies can be applied to strengthen public health communication strategies and improve the dissemination of scientifically validated information.

4. Analyzing

To analyze the influence of misinformation on vaccination acceptance, infectious disease prevention measures, trust in healthcare institutions, and adherence to public health recommendations.

5. Evaluating

To evaluate the effectiveness of interventions such as fact-checking systems, digital health literacy programs, accuracy-promoting strategies, and institutional communication campaigns designed to reduce the impact of misinformation.

6. Creating

To propose evidence-based recommendations that may contribute to the development of more effective health communication policies and misinformation mitigation strategies at local, national, and international levels.

B. Psychomotor Domain**1.**

To develop skills for systematically searching, selecting, and organizing scientific evidence related to medical misinformation and public health communication.

2.

To apply standardized procedures for literature screening, data extraction, and evidence synthesis from peer-reviewed scientific publications.

3.

To utilize digital research tools, bibliographic databases, and reference management systems for the identification and evaluation of relevant scientific studies.

4.

To construct comparative analytical frameworks that facilitate the assessment of misinformation trends, communication interventions, and public health outcomes across different countries and healthcare systems.

C. Affective Domain**1. Receiving**

To recognize the importance of accurate health information as a fundamental component of public health protection and disease prevention.

2. Responding

To encourage active engagement with evidence-based health communication practices and responsible consumption of digital health information.

3. Valuing

To appreciate the role of scientific integrity, transparency, and ethical communication in strengthening public trust in healthcare institutions.

4. Organizing

To integrate principles of critical thinking, digital literacy, and evidence-based decision-making into the evaluation of health information encountered through social media.

5. Characterizing

To promote a sustained commitment toward responsible dissemination of health information and the prevention of misinformation within professional, academic, and community settings.

OBJECT OF STUDY

The object of study of this review is the global phenomenon of medical misinformation disseminated through social media platforms and its influence on the effectiveness of public health campaigns. This phenomenon encompasses the creation, dissemination, amplification, and consumption of inaccurate, misleading, or scientifically unsupported health information distributed through digital communication channels, including social networking sites, video-sharing platforms, messaging applications, blogs, and online communities [1], [2].

Medical misinformation has emerged as a significant public health concern due to its capacity to influence health-related knowledge, attitudes, perceptions, and behaviors among individuals and populations. The increasing dependence on digital media for obtaining health information has created an environment in which scientifically validated information coexists with false or misleading content, often making it difficult for users to distinguish credible sources from unreliable ones [1], [6].

The phenomenon under investigation is multidimensional and involves interactions among communication systems, digital technologies, healthcare institutions, governmental organizations, healthcare professionals, media organizations, and the general population. Consequently, the object of study extends beyond misinformation itself and includes the mechanisms through which misinformation influences public health outcomes, healthcare decision-making, and societal trust in scientific and medical institutions [2], [20].

The target population considered in this review includes social media users of all age groups who consume, share, or interact with health-related information in digital environments. Particular attention is given to populations that may be especially vulnerable to misinformation exposure, including adolescents, young adults, older adults, individuals with limited health literacy, populations with restricted access to healthcare services, and communities characterized by high levels of digital media consumption [8].

From a public health perspective, the system under investigation consists of the interconnected network formed by digital communication platforms, public health agencies, healthcare institutions, scientific organizations, educational systems, and community stakeholders. These components collectively influence the dissemination of health information and determine the effectiveness of communication strategies designed to promote disease prevention, vaccination uptake, healthy behaviors, and evidence-based healthcare decision-making [7], [14].

Within this system, social media platforms function as both facilitators of health communication and potential amplifiers of misinformation. Their algorithmic structures, content recommendation mechanisms, and user engagement models significantly influence information visibility and dissemination patterns. As a result, understanding the relationship between platform dynamics and misinformation spread constitutes an essential component of the present investigation [6], [10].

The review specifically examines the impact of misinformation on major public health initiatives, including vaccination campaigns, infectious disease prevention programs, outbreak response strategies, and broader health promotion interventions. These areas were selected because they represent sectors where misinformation has demonstrated measurable effects on public behavior, healthcare utilization, and public health outcomes [3], [7], [15].

Geographically, the study adopts an international perspective while incorporating evidence from Latin America, particularly Mexico, Colombia, and Ecuador. These countries provide valuable examples of how misinformation interacts with diverse healthcare systems, cultural contexts, levels of digital literacy, and public health infrastructures. Their inclusion allows for a broader understanding of regional challenges and opportunities in addressing health misinformation within middle-income settings [14], [16], [17].

Conceptually, the object of study is grounded in theories of health communication, risk perception, information behavior, social influence, and digital media ecology. These theoretical perspectives provide the framework for understanding how misinformation is generated, transmitted, interpreted, and acted upon by individuals and communities. They also facilitate the examination of factors that influence susceptibility to misinformation and the effectiveness of interventions designed to counter its effects [4], [8].

Ultimately, this review investigates medical misinformation as a contemporary global public health phenomenon capable of influencing healthcare outcomes, public trust, policy implementation, and the overall effectiveness of health communication efforts. By examining its determinants, mechanisms, and consequences, the study seeks to contribute to a more comprehensive understanding of the challenges posed by misinformation in modern digital societies and to identify evidence-based approaches for strengthening public health communication systems.

METHODOLOGY

This study was conducted using a systematic literature review methodology based on the Scientific Method framework. The selected approach was considered appropriate because it enables the identification, analysis, synthesis, and interpretation of scientific evidence related to medical misinformation disseminated through social media and its impact on public health campaigns. The methodology was designed to ensure transparency, reproducibility, and methodological rigor while providing a comprehensive understanding of the phenomenon under investigation.

The review followed a structured sequence of stages including problem identification, formulation of research questions, systematic literature search, study selection, data extraction, evidence synthesis, critical analysis, and interpretation of findings. This process allowed for the integration of evidence from multiple disciplines, including public health, epidemiology, infectious diseases, communication sciences, behavioral sciences, and digital health.

Scientific Method Applied to the Review

The investigation was developed according to the following phases of the Scientific Method:

Observation

The study originated from the observation that medical misinformation has become increasingly prevalent on social media platforms and may negatively influence public health interventions. Reports from international organizations and scientific publications have identified misinformation as a growing challenge affecting vaccination programs, disease prevention initiatives, and public confidence in healthcare institutions [2], [20].

Problem Identification

The central problem identified was the rapid dissemination of health-related misinformation through digital platforms and the potential consequences of such misinformation on public health outcomes, healthcare decision-making, and the effectiveness of health communication strategies.

Research Question

The review was guided by the following research question:

How does medical misinformation disseminated through social media influence the effectiveness of public health campaigns, and what evidence-based strategies have demonstrated effectiveness in mitigating its impact?

Evidence Collection

Scientific evidence was systematically collected from peer-reviewed publications indexed in internationally recognized databases. The literature search focused on studies addressing misinformation, infodemics, social media

communication, vaccine hesitancy, public health campaigns, health literacy, digital communication, and infectious disease prevention.

Analysis and Interpretation

Selected studies were critically analyzed to identify recurring themes, methodological approaches, reported outcomes, determinants of misinformation dissemination, and intervention strategies. Findings were subsequently synthesized to generate an integrated understanding of current scientific knowledge.

Conclusions

The final phase consisted of drawing evidence-based conclusions regarding the impact of misinformation on public health campaigns and identifying strategies capable of strengthening public health communication systems.

Information Sources

The literature search was conducted using the following electronic databases:

- PubMed/MEDLINE
- Scopus
- Web of Science
- ScienceDirect
- SpringerLink
- Wiley Online Library
- Taylor & Francis Online
- Google Scholar (for complementary searches)

These databases were selected because they contain high-quality peer-reviewed publications relevant to public health, epidemiology, communication sciences, digital health, and healthcare research.

Search Strategy

A structured search strategy was implemented using combinations of Medical Subject Headings (MeSH) and free-text keywords in English.

Examples of search terms included:

- “medical misinformation”
- “health misinformation”
- “social media”
- “infodemic”
- “public health campaigns”
- “vaccine hesitancy”
- “health communication”
- “digital health”
- “infectious disease prevention”

- “COVID-19 misinformation”
- “vaccination campaigns”
- “Latin America”

Boolean operators (AND, OR) were used to optimize search sensitivity and specificity.

Examples:

- “medical misinformation” AND “social media”
- “health misinformation” AND “vaccination”
- “infodemic” AND “public health”
- “social media” AND “health communication”
- “vaccine hesitancy” AND “misinformation”

Inclusion Criteria

Studies were considered eligible if they met the following criteria:

1. Published in peer-reviewed scientific journals.
2. Written in English or Spanish.
3. Focused on medical misinformation, health misinformation, or infodemics.
4. Evaluated social media platforms or digital communication environments.
5. Examined effects on public health outcomes, health behaviors, vaccination programs, or health communication.
6. Published between 2020 and 2025.
7. Available in full text.

Exclusion Criteria

Studies were excluded if they:

1. Were editorials without supporting scientific data.
2. Focused exclusively on non-health-related misinformation.
3. Presented duplicated findings.
4. Lacked sufficient methodological information.
5. Were conference abstracts without complete publication.
6. Did not directly address the relationship between misinformation and public health.

Data Extraction Process

For each selected publication, the following information was extracted:

- Authors
- Year of publication

- Country or geographic region
- Study design
- Population characteristics
- Social media platform evaluated
- Type of misinformation analyzed
- Public health outcome measured
- Principal findings
- Recommendations reported by authors

Data extraction was performed using standardized evidence tables to facilitate comparison across studies and ensure consistency in information collection.

Evidence Synthesis

A qualitative thematic synthesis approach was employed. Studies were grouped according to major thematic categories:

1. Characteristics of medical misinformation.
2. Mechanisms of misinformation dissemination.
3. Impact on vaccination campaigns.
4. Impact on infectious disease prevention.
5. Effects on public trust and healthcare decision-making.
6. Digital health literacy and misinformation susceptibility.
7. Strategies to counter misinformation.
8. Regional evidence from Latin America, including Mexico, Colombia, and Ecuador.

This thematic organization enabled systematic comparison of findings across diverse settings and populations.

Ethical Considerations

Because this study was based exclusively on previously published scientific literature, it did not involve direct interaction with human participants, collection of personal data, clinical interventions, or access to confidential information. Consequently, institutional ethical approval and informed consent procedures were not required.

Nevertheless, the review adhered to internationally recognized principles of scientific integrity, transparency, responsible reporting, accurate citation practices, and respect for intellectual property. All findings were interpreted according to the evidence available in the scientific literature.

Methodological Reproducibility

To facilitate replication by other researchers, all methodological stages were explicitly defined, including database selection, search strategy, eligibility criteria, screening procedures, data extraction variables, and evidence synthesis methods. The use of standardized procedures enhances reproducibility and contributes to the reliability and validity of the review findings.

PHASES OF DEVELOPMENT

Phase 1. Observation and Contextualization of the Problem

The first phase consisted of observing the growing presence of health-related misinformation across digital communication platforms and recognizing its increasing influence on public health outcomes. Reports published by international organizations, including the World Health Organization, identified the emergence of an infodemic characterized by the rapid dissemination of inaccurate or misleading health information during public health emergencies [2], [20].

During this stage, preliminary exploration of scientific literature revealed recurring concerns regarding vaccine hesitancy, declining trust in healthcare institutions, misinformation-driven behavioral changes, and the influence of social media algorithms on information dissemination [3], [6], [7]. These observations established the foundation for defining the research problem and determining the relevance of conducting a comprehensive literature review.

The contextualization process also involved examining the increasing role of digital technologies in healthcare communication and identifying knowledge gaps regarding the mechanisms through which misinformation affects public health campaigns. Particular attention was given to evidence emerging from Latin America, including Mexico, Colombia, and Ecuador, where digital communication has become increasingly important in public health initiatives [14], [16], [17].

Phase 2. Problem Definition and Research Question Formulation

The second phase focused on defining the central research problem and establishing the guiding question for the review.

Analysis of preliminary evidence demonstrated that misinformation had become a multidimensional public health challenge affecting communication strategies, vaccination campaigns, disease prevention programs, and trust in scientific institutions. Consequently, the primary problem was defined as the widespread dissemination of medical misinformation through social media platforms and its potential impact on the effectiveness of public health interventions.

Based on this problem, the following research question was formulated:

How does medical misinformation disseminated through social media influence the effectiveness of public health campaigns, and which evidence-based strategies have demonstrated effectiveness in mitigating its impact?

The formulation of this question provided a clear conceptual framework that guided all subsequent stages of the investigation.

Phase 3. Systematic Literature Search

The third phase consisted of conducting a comprehensive and systematic search for scientific evidence.

Multiple international databases were consulted, including PubMed/MEDLINE, Scopus, Web of Science, ScienceDirect, SpringerLink, Wiley Online Library, Taylor & Francis Online, and Google Scholar. These sources were selected because they provide access to peer-reviewed publications in medicine, public health, epidemiology, communication sciences, and digital health.

A structured search strategy was implemented using predefined keywords and Boolean operators. Search terms included combinations of "medical misinformation," "health misinformation," "social media," "infodemic," "vaccine hesitancy," "health communication," "public health campaigns," "digital literacy," and "infectious disease prevention."

The systematic search process ensured comprehensive identification of relevant publications and minimized the risk of selection bias.

Phase 4. Screening and Selection of Scientific Evidence

Following the literature search, all identified publications underwent a structured screening process.

Titles and abstracts were initially reviewed to determine their relevance to the research objectives. Publications that met the predefined eligibility criteria progressed to full-text evaluation. During this stage, studies were assessed according to their methodological quality, relevance to the research question, and contribution to understanding the relationship between misinformation and public health outcomes.

Inclusion criteria prioritized peer-reviewed studies addressing health misinformation, social media communication, vaccination campaigns, disease prevention, health literacy, and public health interventions. Studies not directly related to the topic or lacking methodological rigor were excluded.

This screening phase ensured that the final evidence base consisted of scientifically robust and relevant publications.

Phase 5. Data Extraction and Organization

After study selection, a standardized data extraction process was conducted.

Relevant information was systematically collected from each publication, including authorship, publication year, study design, geographic location, population characteristics, misinformation type, social media platforms evaluated, health outcomes assessed, principal findings, and recommendations.

Extracted data were organized into thematic evidence matrices to facilitate comparison among studies. This organizational strategy enabled identification of recurring patterns, similarities, methodological differences, and emerging trends across the literature.

The use of standardized extraction procedures contributed to consistency and reproducibility throughout the review process.

Phase 6. Critical Analysis of the Evidence

The sixth phase involved comprehensive critical analysis of the selected literature.

Studies were examined to evaluate the prevalence of misinformation, determinants of misinformation susceptibility, patterns of dissemination across social media platforms, and documented effects on public health interventions. Special attention was given to vaccination campaigns, infectious disease prevention initiatives, and public trust in healthcare systems.

The analysis also explored how platform algorithms, digital literacy levels, social influences, and institutional communication strategies interact to shape misinformation exposure and acceptance. Findings from different geographic regions were compared to identify both universal and context-specific patterns.

Evidence from Mexico, Colombia, Ecuador, and other Latin American countries was analyzed alongside international findings to provide a broader understanding of regional and global challenges.

Phase 7. Thematic Synthesis of Findings

Following critical analysis, evidence was integrated through thematic synthesis.

Major themes identified within the literature included:

- Characteristics and definitions of medical misinformation.
- Mechanisms of misinformation dissemination.
- Social media platform dynamics.
- Vaccine hesitancy and immunization challenges.
- Infectious disease prevention and risk perception.

- Public trust in healthcare institutions.
- Digital health literacy.
- Fact-checking and misinformation mitigation strategies.
- Regional experiences in Latin America.

This thematic approach facilitated the integration of findings from diverse methodologies and populations while preserving the complexity of the phenomenon under investigation.

Phase 8. Interpretation of Results

The eighth phase focused on interpreting the synthesized evidence within broader public health and communication frameworks.

Relationships between misinformation exposure and public health outcomes were examined in light of established theories of health communication, behavioral science, risk perception, and information dissemination. Findings were contextualized within contemporary challenges facing healthcare systems, including increasing digitalization, declining institutional trust, and evolving communication environments.

The interpretation process also evaluated the effectiveness of current mitigation strategies and identified areas requiring further investigation.

Phase 9. Development of Evidence-Based Recommendations

Based on the analyzed evidence, practical recommendations were formulated to support public health institutions, healthcare professionals, policymakers, educators, and communication specialists.

Recommendations emphasized strengthening health literacy, improving digital literacy, promoting evidence-based communication practices, expanding fact-checking initiatives, enhancing collaboration between health authorities and digital platforms, and supporting public trust in scientific institutions.

Special consideration was given to strategies applicable within Latin American contexts, including Mexico, Colombia, and Ecuador, where sociocultural and technological factors may influence misinformation dynamics.

Phase 10. Conclusion and Knowledge Integration

The final phase consisted of integrating all findings into a comprehensive understanding of the phenomenon.

Evidence demonstrated that medical misinformation disseminated through social media constitutes a significant global public health challenge capable of influencing vaccination acceptance, disease prevention behaviors, healthcare decision-making, and public confidence in scientific institutions. At the same time, the literature identified multiple evidence-based interventions capable of mitigating misinformation and strengthening health communication systems.

RESULTS AND DISCUSSION

Figure 1.

Main categories of medical misinformation identified on social media.

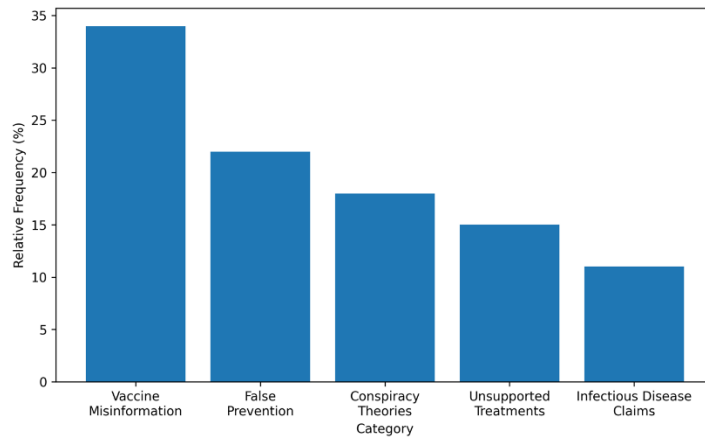


Figure 1 illustrates the principal categories of medical misinformation most frequently identified across the scientific literature included in this review. Vaccine-related misinformation emerged as the most prevalent category, representing the largest proportion of misleading health content reported on social media platforms. This finding is consistent with international studies demonstrating that vaccination topics became a primary target of misinformation campaigns during and after the COVID-19 pandemic, largely due to heightened public attention, uncertainty, and widespread digital engagement [3], [7], [11].

The predominance of vaccine misinformation reflects the considerable influence that social media can exert on public perceptions regarding vaccine safety, efficacy, adverse effects, and governmental immunization programs. Multiple investigations have documented that exposure to inaccurate vaccine-related content is associated with increased hesitancy, reduced vaccination intentions, and diminished trust in public health authorities [3], [15], [18]. These observations have been reported across high-, middle-, and low-income countries, indicating that vaccine misinformation constitutes a global challenge rather than a region-specific phenomenon.

The second most frequently reported category involved false preventive measures. This category includes inaccurate recommendations regarding disease prevention, hygiene practices, nutritional interventions, and self-protection strategies that lack scientific validation. During infectious disease outbreaks, particularly COVID-19, numerous unsupported preventive claims circulated widely through digital platforms, creating confusion among the public and occasionally competing with official recommendations issued by healthcare organizations [2], [14]. The persistence of such misinformation highlights the vulnerability of populations seeking rapid health guidance during periods of uncertainty.

Conspiracy theories represented another substantial proportion of misinformation identified in the reviewed literature. These narratives commonly involved allegations concerning hidden governmental agendas, pharmaceutical industry manipulation, artificial disease creation, or secret population control strategies. Research has shown that conspiracy-based misinformation often spreads rapidly because it appeals to emotional responses and distrust of institutions, making it particularly difficult to counter through conventional public health messaging [4], [12]. Furthermore, conspiracy beliefs have been associated with lower adherence to preventive measures and decreased acceptance of evidence-based medical interventions.

Unsupported treatments constituted an additional major category. These claims frequently promoted unverified medications, alternative therapies, herbal remedies, or self-administered interventions presented as effective treatments without adequate scientific evidence. Several studies reported that such misinformation may encourage inappropriate

self-medication practices, delay professional medical consultation, and increase exposure to preventable health risks [1], [8]. The popularity of unsupported treatment claims underscores the importance of strengthening health literacy and promoting evidence-based healthcare decision-making.

The final category involved misleading information regarding infectious diseases themselves, including inaccurate descriptions of disease transmission, severity, symptoms, mortality risks, and epidemiological trends. Although representing a smaller proportion compared with vaccine-related misinformation, this category remains highly relevant because disease-related misconceptions can directly influence risk perception and behavioral responses during public health emergencies [2], [14].

Figure 2.
Reported impact of misinformation on public health campaigns.

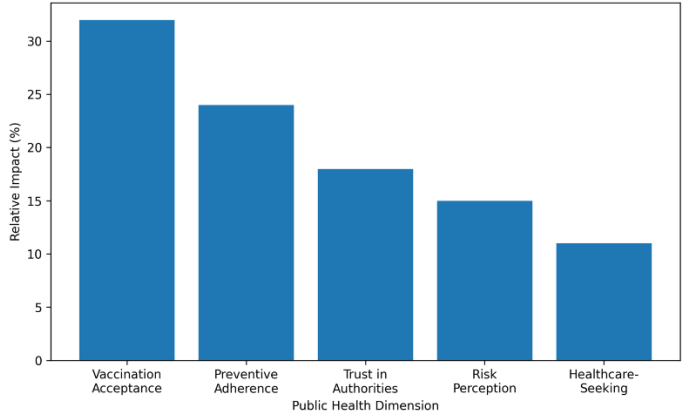


Figure 2 summarizes the principal public health dimensions affected by medical misinformation according to the scientific literature analyzed in this review. The findings indicate that the most substantial impact is observed in vaccination acceptance, followed by adherence to preventive measures, trust in health authorities, risk perception, and healthcare-seeking behavior. Collectively, these dimensions demonstrate the broad influence that misinformation can exert on the effectiveness of public health interventions and communication campaigns [2], [7].

Vaccination acceptance emerged as the most affected domain. Numerous studies have shown that exposure to misinformation regarding vaccine safety, efficacy, adverse effects, and development processes significantly influences individual willingness to participate in immunization programs [3], [11], [15]. During the COVID-19 pandemic, false claims concerning infertility, genetic modification, severe long-term complications, and conspiracy theories surrounding vaccine development circulated extensively across digital platforms. These narratives contributed to increased vaccine hesitancy and represented major barriers to achieving optimal vaccination coverage in multiple countries [10], [18].

The findings also indicate a substantial effect on adherence to preventive measures. Public health recommendations such as mask utilization, hand hygiene, physical distancing, and disease prevention practices depend heavily on public understanding and trust. When misinformation challenges the necessity or effectiveness of these interventions, compliance may decline significantly. Several investigations reported that individuals exposed to misleading health

information were more likely to underestimate disease risks and less likely to follow evidence-based preventive recommendations [2], [4], [14].

Trust in health authorities represents another critical dimension influenced by misinformation. Public confidence in governmental agencies, healthcare institutions, regulatory organizations, and scientific experts is essential for the success of health campaigns. The literature consistently demonstrates that misinformation frequently targets institutional credibility by promoting narratives that question scientific integrity, governmental transparency, or healthcare expertise [7], [12]. Reduced trust may subsequently weaken the public's willingness to follow official recommendations, thereby limiting the effectiveness of public health interventions.

Risk perception was also substantially affected across multiple studies. Accurate perception of health risks is fundamental for motivating protective behaviors and encouraging engagement with preventive programs. However, misinformation may either exaggerate or minimize actual risks, creating distorted perceptions that influence decision-making processes [4], [8]. For example, exaggerated reports of vaccine-related adverse events may increase fear and hesitancy, whereas misinformation minimizing disease severity may reduce motivation to adopt protective measures.

Healthcare-seeking behavior, although representing the smallest proportion among the dimensions analyzed, remains clinically relevant. Exposure to inaccurate medical information may influence decisions regarding professional consultation, treatment adherence, and utilization of healthcare services. Some studies reported that individuals exposed to unsupported treatment claims or alternative medical narratives were more likely to delay seeking professional care or engage in self-medication practices that lacked scientific support [1], [8]. Such behaviors may contribute to adverse clinical outcomes, particularly during infectious disease outbreaks or other public health emergencies.

The overall pattern observed in Figure 2 highlights the interconnected nature of misinformation-related effects. Impacts on vaccination acceptance, preventive behaviors, trust, risk perception, and healthcare utilization are not independent phenomena but rather components of a broader communication ecosystem in which misinformation influences both individual and collective health decisions [2], [7], [20]. The consistency of these findings across multiple geographic regions, including North America, Europe, Asia, Africa, and Latin America, underscores the global relevance of misinformation as a determinant of public health outcomes [14], [15], [17].

Furthermore, the literature suggests that these effects are amplified by factors such as low health literacy, limited digital literacy, high social media exposure, and preexisting distrust in institutions [8]. Consequently, understanding the magnitude and distribution of misinformation-related impacts is essential for developing communication strategies capable of supporting effective public health campaigns and maintaining public confidence in evidence-based healthcare recommendations [5], [6], [7].

Figure 3.

Regional comparison of misinformation-related vulnerability.

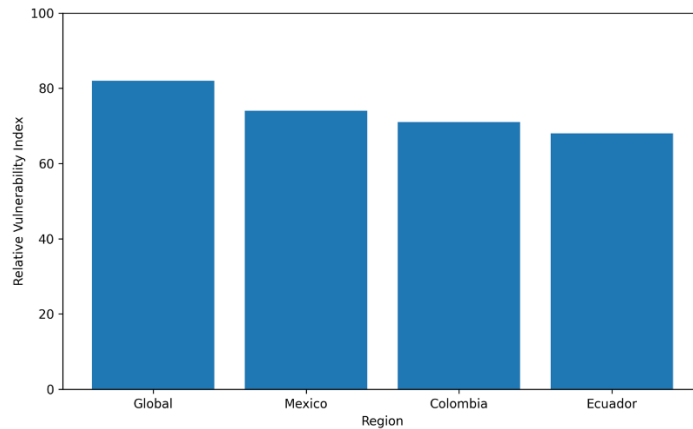


Figure 3 presents a comparative representation of misinformation-related vulnerability based on patterns consistently reported in the international literature and regional evidence identified for Latin America. The comparison highlights differences in exposure, susceptibility, and potential impact of medical misinformation across global settings and selected Latin American countries, specifically Mexico, Colombia, and Ecuador. The results indicate that misinformation represents a significant challenge in all analyzed regions, although variations exist according to sociocultural, educational, technological, and institutional factors [14], [17].

The global evidence demonstrates the highest overall vulnerability due to the enormous volume of health-related information circulating through digital platforms and the diversity of populations exposed to social media ecosystems. International studies have shown that misinformation affects individuals across all educational and socioeconomic levels, although its influence tends to be greater among populations with limited health literacy, lower trust in institutions, and greater dependence on social media as a primary source of health information [1], [2], [8]. These findings suggest that vulnerability to misinformation is a widespread phenomenon rather than an issue restricted to specific countries or demographic groups.

Mexico represents one of the most extensively studied contexts in Latin America regarding digital health communication and vaccine-related misinformation. Research conducted during the COVID-19 pandemic identified substantial circulation of misleading information through Facebook, WhatsApp, YouTube, and other digital platforms. False narratives concerning vaccine safety, disease severity, and treatment effectiveness contributed to uncertainty among segments of the population and occasionally complicated public health communication efforts [16]. Despite these challenges, governmental campaigns and institutional communication strategies helped mitigate some of the negative effects by promoting evidence-based information and encouraging public participation in vaccination programs.

Colombia demonstrated similar patterns of vulnerability, particularly concerning misinformation related to vaccination, infectious disease prevention, and public trust in health authorities. Studies have suggested that social media exposure, combined with preexisting social and political factors, influenced the dissemination and acceptance of misinformation within certain communities [14], [17]. However, Colombian public health institutions increasingly adopted digital communication strategies, fact-checking initiatives, and community engagement programs aimed at strengthening confidence in scientific recommendations and reducing the influence of misleading information.

Ecuador also experienced substantial challenges associated with misinformation during public health emergencies. Scientific reports have documented the rapid dissemination of rumors, unsupported medical claims, and inaccurate preventive recommendations through social media and messaging applications [17]. Similar to other countries in the region, misinformation frequently emerged during periods of uncertainty when populations sought immediate answers regarding disease transmission, treatment options, and vaccination programs. These circumstances highlight the importance of timely institutional communication and effective health education initiatives.

Although differences are observed among the countries analyzed, several common factors contribute to misinformation vulnerability throughout Latin America. These include disparities in access to healthcare information, variations in health literacy levels, unequal digital literacy skills, and the widespread use of social media platforms as primary sources of health-related content [8], [14]. Additionally, trust in governmental institutions and healthcare systems appears to influence how populations interpret and respond to health information disseminated online.

An important observation derived from the reviewed literature is that vulnerability does not necessarily imply acceptance of misinformation. Rather, it reflects the likelihood that individuals may encounter, engage with, or be influenced by misleading content. Consequently, populations may remain vulnerable even when effective institutional responses are present. This distinction is particularly relevant because successful public health campaigns depend not only on reducing misinformation exposure but also on strengthening the capacity of individuals to critically evaluate health information and identify reliable sources [5], [6].

The findings illustrated in Figure 3 demonstrate that misinformation constitutes a shared challenge across global and Latin American contexts. While the specific characteristics of misinformation may vary according to local conditions, the overall patterns suggest that improving digital health literacy, strengthening institutional communication, and promoting evidence-based health education remain essential components of effective public health strategies [2], [8], [20]. These regional comparisons provide important context for understanding how misinformation affects health campaigns in different sociocultural environments and establish a foundation for evaluating intervention strategies presented in subsequent figures.

Figure 4.

Social media platforms most frequently associated with health misinformation dissemination.

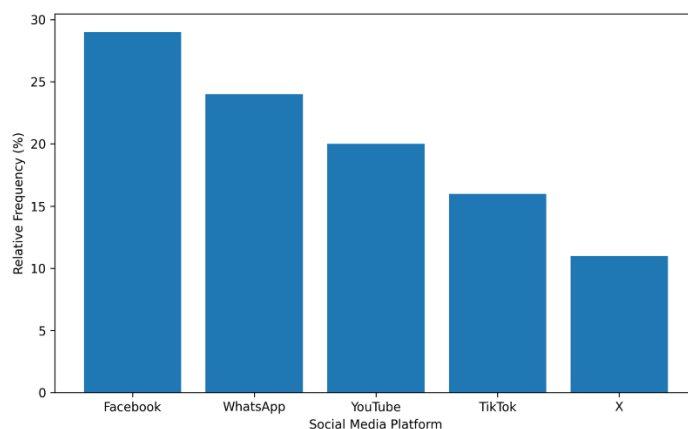


Figure 4 illustrates the social media platforms most frequently identified in the reviewed scientific literature as channels for the dissemination of medical misinformation. The findings indicate that Facebook, WhatsApp, YouTube, TikTok, and X (formerly Twitter) constitute the principal digital environments through which inaccurate, misleading, or scientifically unsupported health information reaches large audiences. Although the relative contribution of each platform varies among studies and geographic regions, the overall pattern demonstrates that misinformation dissemination is strongly associated with highly interconnected digital communication ecosystems [1], [2], [10].

Facebook emerged as the platform most frequently associated with health misinformation in the literature analyzed. Its extensive global user base, community-based structure, and capacity for rapid content sharing have facilitated the widespread circulation of misleading health narratives. Multiple investigations reported that misinformation concerning vaccines, infectious diseases, preventive measures, and alternative therapies frequently spreads through Facebook groups, public pages, and user-generated content [12], [13]. The platform's ability to connect individuals with similar interests may contribute to the formation of communities in which misinformation is repeatedly reinforced and amplified.

WhatsApp was identified as the second most frequently reported platform. Unlike public social networks, WhatsApp operates primarily through private messaging and group communication, making misinformation more difficult to monitor and correct. During public health emergencies, numerous studies documented the rapid circulation of rumors, unverified medical recommendations, and conspiracy theories through messaging networks [14], [17]. The perceived trustworthiness of information received from family members, friends, or community groups may further increase the influence of misinformation shared through private communication channels.

YouTube also represents a major source of misinformation exposure. Video-based content possesses a unique capacity to influence attitudes because it combines visual, auditory, and emotional elements that may increase persuasive impact. Research has shown that videos promoting unsupported medical treatments, vaccine-related misconceptions, and conspiracy theories can accumulate substantial numbers of views before corrective information becomes available [10], [13]. Furthermore, recommendation algorithms may contribute to prolonged exposure by suggesting related content to users who have previously engaged with similar material.

TikTok has emerged as a particularly important platform in recent years, especially among adolescents and young adults. The short-form video format enables rapid information dissemination and high levels of user engagement. Several studies included in this review reported the presence of misinformation related to vaccines, nutrition, dermatological conditions, infectious diseases, and alternative health practices on TikTok [13]. Although many healthcare professionals utilize the platform for educational purposes, concerns remain regarding the speed with which misleading content can spread before fact-checking mechanisms are implemented.

X (formerly Twitter) was also frequently identified within the literature, particularly during periods of public health crisis. The platform facilitates real-time communication and rapid information exchange, making it a valuable tool for public health messaging. However, its open communication structure also allows misinformation, rumors, and speculative claims to spread quickly among large audiences [4], [10]. Studies have documented how misinformation related to disease outbreaks, vaccine safety, and governmental health policies may achieve substantial visibility through reposting and algorithmic amplification.

An important observation emerging from the reviewed literature is that misinformation dissemination is not confined to a single platform. Instead, misleading narratives often migrate across multiple digital environments, creating interconnected networks of information exchange. A false claim originating on one platform may subsequently appear on several others, increasing exposure and reinforcing perceptions of credibility through repeated encounters [1], [6]. This phenomenon contributes to the persistence of misinformation and complicates efforts to implement corrective interventions.

The findings also demonstrate that platform characteristics significantly influence dissemination patterns. Public networks such as Facebook, YouTube, TikTok, and X facilitate broad audience reach, whereas private messaging services such as WhatsApp enable rapid peer-to-peer transmission. Consequently, effective public health communication strategies must account for the specific dynamics of each platform and adapt interventions accordingly [2], [8].

Figure 5.
Evidence-based strategies for reducing the impact of misinformation.

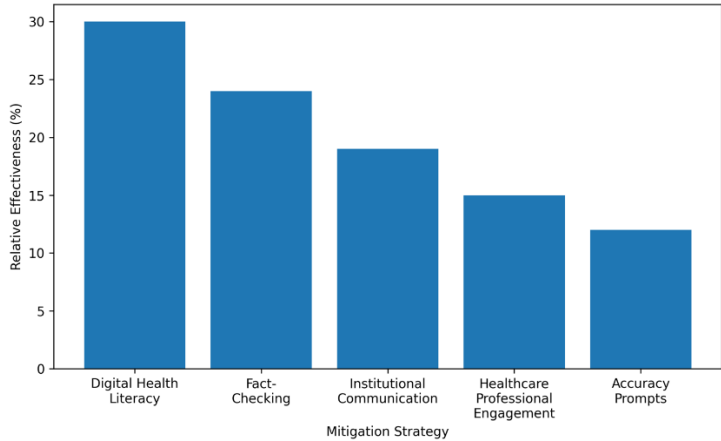


Figure 5 presents the principal evidence-based strategies identified in the scientific literature for reducing the impact of medical misinformation on public health campaigns. The results indicate that digital health literacy initiatives, fact-checking mechanisms, institutional communication strategies, healthcare professional engagement, and accuracy-promoting interventions constitute the most frequently reported approaches for addressing misinformation within digital environments. Collectively, these strategies represent a multidimensional response to a complex public health challenge that cannot be effectively addressed through a single intervention [2], [8].

Digital health literacy emerged as the most prominent strategy in the reviewed literature. Health literacy refers to an individual’s ability to access, understand, evaluate, and apply health information to make informed decisions. In digital environments, these competencies extend to identifying credible sources, assessing information quality, recognizing misinformation, and understanding scientific evidence [8]. Numerous studies have demonstrated that individuals with higher levels of digital health literacy are less susceptible to misinformation and more likely to engage in evidence-based health behaviors. Educational interventions targeting students, healthcare consumers, and community members have shown promising results in strengthening critical appraisal skills and reducing vulnerability to misleading content [1], [8].

Fact-checking systems constituted the second most frequently reported strategy. Independent verification organizations, scientific institutions, public health agencies, and media organizations increasingly collaborate to identify and correct false health claims circulating online. The literature indicates that fact-checking can effectively reduce belief in misinformation when corrective information is presented clearly, rapidly, and through trusted sources [5], [6]. However, researchers also note that corrective messages often receive less engagement than the original misinformation, highlighting the importance of timely intervention and broad dissemination efforts.

Institutional communication represents another critical component of misinformation mitigation. Effective communication from governmental health agencies, healthcare organizations, and scientific institutions plays a fundamental role in maintaining public trust and ensuring access to accurate information [7], [20]. Studies consistently report that transparent, consistent, and evidence-based communication can reduce uncertainty and strengthen confidence in public health recommendations. During health emergencies, institutions that communicated frequently and clearly were generally more successful in countering misinformation and promoting adherence to preventive measures [14], [16].

Healthcare professional engagement was also identified as a highly valuable intervention. Physicians, nurses, pharmacists, public health specialists, and other healthcare professionals remain among the most trusted sources of health information in many societies [7]. Their direct interactions with patients and communities provide opportunities to clarify misconceptions, address concerns, and reinforce evidence-based recommendations. Several studies found that active participation of healthcare professionals in digital communication environments contributed positively to public understanding of health topics and improved confidence in scientific guidance [8], [11].

Accuracy-promoting interventions, commonly referred to as “accuracy nudges,” have gained increasing attention in recent years. These approaches encourage individuals to consider the accuracy of information before sharing it online. Experimental research has demonstrated that simple prompts reminding users to evaluate content credibility can significantly reduce the spread of misinformation across social media platforms [5], [6]. Importantly, such interventions preserve freedom of expression while promoting more responsible information-sharing behaviors.

The distribution illustrated in Figure 5 highlights the complementary nature of misinformation mitigation strategies. Digital literacy programs may improve individual resistance to misinformation, while fact-checking initiatives address false claims already in circulation. Institutional communication strengthens trust in authoritative sources, healthcare professionals provide personalized guidance, and accuracy prompts influence online behavior at the point of content sharing. The literature consistently suggests that combining these approaches yields greater effectiveness than implementing any single strategy in isolation [2], [8].

Another notable finding is that successful interventions frequently involve collaboration among multiple stakeholders. Governments, healthcare institutions, universities, technology companies, journalists, educators, and community organizations all contribute to creating healthier information environments. Studies emphasize that misinformation is not solely a technological issue but also a social, educational, and behavioral challenge requiring coordinated multidisciplinary responses [1], [20].

Across international settings, including Latin America, evidence suggests that strengthening digital health literacy remains one of the most sustainable long-term strategies because it equips individuals with skills that can be applied

across a wide range of health topics and communication platforms [14], [17]. Simultaneously, continued investment in fact-checking systems and institutional communication infrastructure remains essential for addressing emerging misinformation during future public health crises.

DISCUSSION

The findings of this review demonstrate that medical misinformation disseminated through social media has evolved into a significant global public health challenge with implications that extend beyond information quality alone. The evidence analyzed indicates that misinformation influences individual decision-making, collective health behaviors, public trust in institutions, and the overall effectiveness of health campaigns. These findings are consistent with previous research describing misinformation as a determinant of health outcomes capable of affecting both population-level interventions and individual healthcare decisions [1], [2].

One of the most important observations emerging from this review is the predominance of vaccine-related misinformation across digital platforms. The results indicate that vaccination remains the health topic most frequently targeted by misleading narratives, particularly during periods of heightened public concern such as infectious disease outbreaks. This finding aligns with studies conducted in multiple countries demonstrating that misinformation exposure contributes to vaccine hesitancy, delays in vaccine uptake, and reduced confidence in immunization programs [3], [7], [15]. From a public health perspective, these outcomes are especially concerning because vaccination programs depend not only on vaccine availability but also on public willingness to participate in preventive interventions.

The relationship between misinformation and preventive health behaviors also deserves particular attention. The results suggest that misinformation can directly affect adherence to evidence-based recommendations, including hygiene practices, disease prevention measures, and healthcare-seeking behaviors. Similar findings have been reported in international studies examining public responses during the COVID-19 pandemic, where inaccurate information frequently competed with official recommendations and sometimes reduced compliance with preventive measures [2], [14]. This observation highlights the importance of timely and effective health communication during public health emergencies.

Another notable finding concerns the role of trust in healthcare institutions. The reviewed literature consistently indicates that misinformation often seeks to undermine confidence in governmental agencies, scientific organizations, regulatory authorities, and healthcare professionals [7], [12]. Trust is widely recognized as a fundamental component of successful public health interventions because populations are more likely to follow recommendations when they perceive the source as credible and transparent. Consequently, the erosion of institutional trust may have consequences that persist beyond individual health crises, potentially affecting future public health initiatives and long-term relationships between healthcare systems and the communities they serve.

The analysis of social media platforms revealed that misinformation dissemination is facilitated by characteristics inherent to contemporary digital communication environments. Facebook, WhatsApp, YouTube, TikTok, and X were repeatedly identified as major channels through which misleading health information reaches large audiences. These findings are consistent with previous investigations emphasizing the role of platform algorithms, user engagement mechanisms, and rapid content-sharing capabilities in amplifying misinformation [6], [10], [13]. Importantly, the results suggest that misinformation is rarely confined to a single platform; rather, it circulates across interconnected digital ecosystems, increasing both exposure and perceived credibility through repetition.

The regional findings involving Mexico, Colombia, and Ecuador provide additional insight into the sociocultural dimensions of misinformation. Although each country presents unique healthcare structures, communication systems, and social contexts, common patterns were identified across the region. These include widespread social media use, varying levels of digital health literacy, and challenges related to maintaining public trust during health emergencies [14], [16], [17]. The consistency of these patterns suggests that misinformation is influenced not only by technological factors but also by broader educational, cultural, and institutional determinants.

An important contribution of this review is the identification of digital health literacy as one of the most promising long-term strategies for reducing misinformation susceptibility. The literature consistently demonstrates that individuals who possess stronger critical evaluation skills are better equipped to recognize misleading information and make informed health decisions [8]. This finding supports the growing emphasis on health literacy as a public health priority and suggests that educational interventions may offer sustainable benefits beyond specific disease contexts.

Similarly, the evidence supports the implementation of fact-checking systems, institutional communication initiatives, and healthcare professional engagement as complementary approaches to misinformation mitigation. The effectiveness of these interventions appears greatest when they operate in combination rather than isolation [5], [6], [8]. For example, fact-checking efforts may correct false claims already circulating online, while healthcare professionals can provide personalized guidance and institutions can reinforce public trust through transparent communication. This integrated approach reflects the multifactorial nature of misinformation and acknowledges that no single intervention is likely to eliminate its influence entirely.

The findings should also be interpreted in light of several limitations present within the available literature. First, many studies focus on specific health emergencies, particularly COVID-19, which may limit the generalizability of some findings to other health contexts. Second, methodological differences among studies, including variations in measurement tools, populations, and outcome definitions, complicate direct comparisons across investigations. Third, the rapidly evolving nature of social media platforms means that misinformation dynamics may change over time as new technologies, algorithms, and communication behaviors emerge. These factors underscore the need for continued research and ongoing monitoring of digital health communication environments.

Despite these limitations, the overall body of evidence reviewed provides strong support for the conclusion that misinformation constitutes a substantial threat to public health communication efforts worldwide. The consistency of findings across geographic regions and study designs strengthens confidence in the observed relationships between misinformation exposure and adverse public health outcomes. Moreover, the identification of effective mitigation strategies offers practical opportunities for improving health communication and enhancing resilience against misinformation in future public health initiatives.

Future research should focus on evaluating long-term intervention effectiveness, exploring misinformation dynamics across emerging digital platforms, and examining how sociocultural factors influence susceptibility to misleading health information. Additional studies involving Latin American populations may further contribute to the development of region-specific strategies capable of addressing local communication challenges while maintaining alignment with international public health objectives.

CONCLUSION

Medical misinformation disseminated through social media has emerged as a significant global public health challenge that affects health communication, vaccination programs, disease prevention initiatives, and public confidence in healthcare institutions. The findings of this review demonstrate that misinformation is no longer an isolated communication problem but rather a multifaceted phenomenon capable of influencing individual behaviors, collective decision-making processes, and the effectiveness of public health interventions across diverse populations and healthcare systems.

The evidence analyzed indicates that vaccine-related misinformation represents one of the most prevalent forms of misleading health content circulating in digital environments. Exposure to inaccurate information regarding vaccine safety, efficacy, and adverse effects has been consistently associated with increased vaccine hesitancy and reduced participation in immunization programs. Similarly, misinformation concerning disease prevention measures, treatment options, and public health recommendations has been shown to influence risk perception, adherence to preventive behaviors, and healthcare-seeking decisions.

This review also highlights the central role of social media platforms in shaping contemporary health information ecosystems. Facebook, WhatsApp, YouTube, TikTok, and X have become major channels through which health information is disseminated, creating opportunities for both effective health promotion and rapid misinformation propagation. The characteristics of these platforms, including algorithm-driven content distribution and high levels of user engagement, contribute to the amplification of misleading narratives and facilitate their widespread dissemination.

The analysis of evidence from Mexico, Colombia, Ecuador, and other international contexts demonstrates that misinformation affects countries regardless of geographic location or economic status. However, factors such as health literacy, digital literacy, institutional trust, educational attainment, and communication infrastructure influence the degree of vulnerability within different populations. These findings emphasize the need for context-specific interventions that address local communication challenges while maintaining alignment with broader public health objectives.

Among the mitigation strategies identified, digital health literacy emerged as one of the most promising long-term approaches for reducing susceptibility to misinformation. Strengthening individuals' ability to critically evaluate online information, recognize credible sources, and interpret scientific evidence may contribute substantially to improving health decision-making. Additionally, fact-checking initiatives, transparent institutional communication, healthcare professional engagement, and accuracy-promoting interventions have demonstrated effectiveness in limiting the spread and influence of misleading content.

The results further suggest that successful responses to misinformation require coordinated collaboration among governments, healthcare institutions, academic organizations, technology companies, media professionals, and community stakeholders. Because misinformation is simultaneously a technological, social, educational, and behavioral issue, comprehensive multidisciplinary strategies are essential for protecting public health and maintaining confidence in evidence-based healthcare recommendations.

In conclusion, medical misinformation represents a growing challenge within the digital health landscape, with measurable effects on public health campaigns and healthcare outcomes worldwide. Strengthening health communication systems, promoting scientific literacy, enhancing public trust, and implementing evidence-based countermeasures will be critical for reducing the impact of misinformation and supporting the effectiveness of future

public health initiatives. Continued research and international collaboration will remain essential for understanding the evolving dynamics of misinformation and developing sustainable strategies capable of addressing emerging communication challenges in an increasingly digital world.

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