Spread of Misinformation During Emergencies and Strategies to Mitigate its Impacts

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Abstract

The rapid growth of social media has transformed how information is consumed, particularly during public health emergencies like the COVID-19 pandemic. While these platforms enable the immediate dissemination of critical information, they also facilitate the spread of misinformation, leading to vaccine hesitancy, distrust in public institutions, and opposition to public health policies. This paper examines the impact of misinformation on emergency response in Canada during the COVID-19 pandemic, focusing on how misinformation spreads, the factors contributing to its dissemination, and strategies to mitigate its effects. Through a review of recent literature, the study highlights the role of social media in amplifying false narratives, the psychological and demographic factors that make individuals susceptible to misinformation, and the need for a multifaceted approach to combat its spread. Key findings suggest that effective crisis communication, technological interventions, and user-centric strategies are essential to counter misinformation. The paper concludes with recommendations for improving public health communication, enhancing media literacy, and leveraging technological advancements to detect and mitigate misinformation in future emergencies.

Key words: misinformation, public safety, emergency management, crisis communication

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The rapid and continuous growth of social media usage has fundamentally transformed the way people consume information. These platforms have become deeply embedded in daily life, shaping public discourse and influencing decision-making. According to Statistics Canada (Government of Canada, 2024), 62% of young Canadians (ages 15 to 24) rely on social media as their primary source of news and information, compared to just 18% of older Canadians. This shift presents both opportunities and challenges, while social media allows efficient dissemination of critical information, it also creates an environment where misinformation can thrive.

Social media platforms can be a powerful tool for crisis communication during an emergency as they can be used on a large scale, it uses a two-way communication style and user interactions boost the propagation of content (Kosowski & Luzar, 2020). However, the same characteristics that make it a robust and wide-reaching accurate dissemination tool are the ones that contribute to the massive spread of misinformation, disinformation, and conspiracy theories.

During crises, such as the COVID-19 pandemic, the role of social media in public health communication became particularly significant. Platforms like Twitter, Instagram, and YouTube were used by public health agencies to share guidelines and updates. However, these same platforms also facilitated the rapid spread of false or misleading information, fueling vaccine hesitancy, conspiracy theories, and distrust in public institutions.

Crisis situations increase the vulnerability to misinformation and the combination of high-speed information flow, vast user engagement, and algorithm-driven content exposure has

made tackling this issue increasingly complex. Moreover, technological advancements, including Artificial Intelligence (AI) and automated bots, have further amplified the spread of false narratives, making traditional countermeasures less effective.

Given these challenges, understanding how misinformation spreads, how public health agencies communicate on social media, and what strategies can mitigate the impact of misinformation is critical. The act of sharing misleading information on social media is often done unintentionally (Melchior & Oliveira 2024), however, the fabrication of fake news, images or videos is deliberate and intentional these two actions are given different names, misinformation and disinformation respectively. For practical purposes, the term misinformation will be used in this paper as an umbrella term that encompasses, disinformation, fake news, deep-fakes, and any other that fit. The term misinformation as an umbrella term has been used by other researchers noting that most studies use this term to refer to different types of misleading information without recognizing the difference from each other (Buntain et al., 2024).

This paper will focus on ways that have been developed to combat misinformation during emergencies and will review the ways misinformation is shared and its impacts. The research was conducted by reviewing relevant and recent literature regarding cross-platform disinformation efforts, the echo-chamber phenomenon, the effectiveness of public health messaging, the role of media consumption in shaping public attitudes, digital misinformation identification methods, and user-centric interventions. This paper aims to provide a comprehensive understanding of the evolving landscape of misinformation focusing on the needs of emergency management, and the strategies needed to address it effectively.

Research question:

This study explores the influential factors that contribute to the spread of misinformation and the need to find an approach that can mitigate those impacts during a crisis. Its goal it's to answer the question: What can be done to mitigate the impacts of misinformation during emergencies in Canada? To answer this question 3 sub-questions have been planted, the first is to contextualize the impacts misinformation on social media has on emergency response in Canada, using the COVID-19 as main example, the second is what are the main factors that contribute to the spread of misinformation and some of the dissemination tools and techniques used during the CODVID-19 for this purpose. Finally, the third one is what are some of the strategies regarding crisis communication that can be implemented to mitigate those impacts.

Literature Review

Several themes appeared during the literature analysis, these were separated into one of the three parts of the research question, being: (i)Impacts of misinformation during COVID-19 in Canada, (ii) How misinformation spreads, and (iii) what can be done against misinformation.

Impacts of Misinformation During COVID-19 in Canada

Objection to Public Health Policies and the Influence of Media Consumption

During the COVID-19 pandemic, social media played a critical role in crisis communication, however, Chen et al. (2022) found that public health policies and preventive measures against the spread of the virus were heavily questioned in social media spaces and the message of not following the health recommendation gained a lot of traction. Research conducted by Jamieson & Albaracín (2020) demonstrated the relationship between media consumption and resistance to public health policies. Studies made by Ginossar et al. (2022) and Nazar & Pieters (2021) talked about the amplification effect of social media on conspiracy theories, where claims linking vaccines to autism, population controls by Bill Gates and the

"global elite", and sentiments against governments and public health policies were widely discussed.

In the specific case of Canada, Chen et al. (2022) found that Canadian individuals who used social media as their primary news source were significantly more likely to be vaccine-hesitant, whereas those who consumed traditional news media were 40% less likely to resist vaccination. Statistics Canada (Government of Canada, 2021) reported that 90% of Canadians encountered misinformation online that they suspected was misleading, false, or inaccurate during the pandemic. Nearly half (40%) of Canadians admitted to believing COVID-19 misinformation before later realizing it was false, illustrating the ease with which misleading content spreads. The same statistic (Government of Canada, 2021) also presented that over half (53%) of Canadians had shared COVID-19 information online without verifying its accuracy.

"Between March and November 2021, misinformation contributed to vaccine hesitancy for an estimated 2.35 million people in Canada. If those people who believed COVID-19 to be a hoax or exaggerated had not delayed or refused vaccination, then, by the end of November 2021, there could have been: 198,000 fewer COVID-19 cases 13,000 fewer hospitalizations 3,500 fewer ICU patients, 2,800 fewer deaths and $299 million saved in hospital costs."

Expert Panel on the Socioeconomic Impacts of Science and Health Misinformation (2023)

How misinformation spreads

Vulnerability to misinformation

Many studies have dug into the task of finding the characteristics of those who are more susceptible to misinformation and conspiracy theories and can be classified into two major groups, those likely to engage based on intrinsic characteristics, and those who do it as a response to their current experience and levels of stress or anxiety (Buntain et al., 2024).

Regarding the first group, Guess et al. (2019) studied the individual-level characteristics related to sharing false information from fake news domains during the 2016 U.S. presidential campaign finding age as a persistent characteristic among individuals who share false information, as, on average, users over the age of 65 shared fake news seven more times than younger demographics. Education levels are also an individual characteristic associated with a higher susceptibility to misinformation Scherer et al. (2021) state that less education and health literacy, accompanied by distrust of healthcare care institutions and a positive attitude towards alternative medicine were more vulnerable to many types of health misinformation. However, it is important to highlight that *"highly educated individuals may be equally vulnerable to misinformation when it comes to topics that are central to their identity."* (Chou et al 2020).

Contrary to other studies, in the report presented on Statistics Canada (Government of Canada, 2021) it was stated that in Canadians (between 15-54 years old) education level did not seem to have an impact on whether or not they shared unverified information.

Forms of media consumption can have a strong influence on the susceptibility of individuals to misinformation. Jamieson & Albaracín (2020) studied how people who were mostly exposed to news aggregators like Google or Yahoo, or social media were more likely to believe unfunded theories such as Vitamin C as a COVID-19 preventer, the virus was created by the U.S. government or that the Center for Disease Control and Prevention (CDC) was exaggerating the threat to harm President Trump. Belief in conspiracy theories has been proven to be linked to the frequency of social media use (Enders et al, 2023). However, social media usage alone can not be the sole responsible for promoting conspiracy theories and misinformation, the users must have a belief system friendly to conspiratorial information.

Vulnerability to misinformation and conspiracy theorizing can also be a result of individuals experiencing a stress/anxiety-inducing situation (Buntain et al., 2024). Engaging with misinformation, especially conspiracy theories, can create a sense of control during

uncertain times. Freiling et al. (2023) found that anxiety played a key role in both believing and sharing misinformation during the COVID-19 pandemic. However, research in this area is inconsistent; Coninck et al. (2021) found no overall link between anxiety and misinformation sharing. On the contrary, feelings of lost control and distrust in institutions were stronger influences for spreading misinformation, particularly during the pandemic (Buntain et al., 2024).

Motivation

People share misinformation for various reasons, even if they are generally resistant to it. One major factor is a lack of critical thinking, which Pennycook and Rand (2019) link to an entertainment-driven mindset—when people engage with content for enjoyment, they may be less concerned with its accuracy. It was observed that individuals sometimes share misinformation to engage with friends, without minding the outcomes of sharing possibly false information (Buntain et al., 2024).

Ceylan et al. (2022) propose a different approach by suggesting that the structure of social media platforms plays a more significant role in spreading misinformation than individual factors like lack of critical thinking or political bias, they state that social media platforms have reward systems that encourage users to share information in ways that attract attention from others (likes, shares, comments, etc.). Over time, this leads users to develop habits of sharing information automatically, often without considering whether it's true or false. This habit of sharing information has led to an interesting result that goes against most literature, Ceylan et al. (2022) found that habitual sharers often shared content that contradicted their own political beliefs.

Coordinated Disinformation Efforts

Fabricating and disseminating misinformation on social media is a deliberate decision, studies have shown that the creators of false information have methods and techniques to amplify their messages online. Nazar and Pieters (2021) presented a clear example of this with the study on the *Plandemic* documentary, showing how disinformation campaigns used decentralized strategies to bypass media gatekeeping, leveraging ordinary users to spread false narratives. The Plandemic video was deliberately designed as planned disinformation, with a unique distribution strategy. Its creator encouraged viewers to download and re-upload the video themselves, bypassing traditional media gatekeepers (Willis, 2020). The website explicitly instructed users on how to share the content across multiple platforms, anticipating that major social media sites would remove it.

This approach mirrored referral marketing strategies, often used in advertising, by turning viewers into active participants in spreading the film. Additionally, the tactic evaded censorship, as each removal or account ban generated further attention and controversy, fueling the video's virality. By applying marketing techniques and social change strategies, the creator aimed to amplify misinformation, increase engagement, and accelerate the spread of misleading health claims (Nazar & Pieters, 2021).

A similar practice was exposed by Ginossar et al. (2022) by analyzing how YouTube containing disinformation and conspiracy theories were shared on Twitter to overcome the barriers imposed by the YouTube recommendation algorithms that aimed to prevent these types of messages, demonstrating that cross-platform misinformation sharing was a strategic method used to amplify conspiracy theories (Ginossar et al, 2022; Himelboim et al, 2023)

The message framing and type of content are crucial factors in how well misinformation posts perform. Himelboim et al. (2023) found that the most engaging misinformation posts often contained emotional and fear-inducing language, making them more likely to be shared. On the same note, the most widely shared conspiracy messages tend to be focused on malicious

intent (e.g., suggesting governments or elites purposely caused the pandemic) and secretive actions, like claims that events were hidden from the public (Himelboim et al, 2023; Nazar & Pieters, 2021). Whereas messages that tried to authenticate claims using external sources were less effective, suggesting that misinformation often spreads more through emotional appeals than factual validation (Himelboim et al, 2023),

The "Echo-Chamber" phenomenon in social media

Enders et al. (2023) argue that social media does not directly cause conspiracy beliefs but rather amplifies them among individuals already inclined to believe in conspiratorial explanations. Ginossar et al. (2022) discuss how misinformation spreads within tightly connected, close-knit, coordinated groups, creating an isolated, self-reinforcing information space where confirmation bias is strengthened. Social media platforms algorithmically prioritize engagement, meaning users are repeatedly exposed to content that aligns with their pre-existing beliefs rather than content that challenges them (Nazar & Pieters, 2021).

Viswanath et al. (2021) further illustrate how media consumption plays a crucial role in vaccine attitudes, supporting the idea that individuals exist in ideological echo chambers. Their study found that reliance on conservative media (e.g., Fox News, Breitbart) was associated with vaccine hesitancy, while consumption of mainstream print media (e.g., The New York Times, Washington Post) correlated with higher vaccine acceptance. Surprisingly, their data suggested that social media use itself was not a direct predictor of vaccine hesitancy, contradicting some concerns that platforms like Facebook and Twitter are the primary drivers of misinformation. Instead, the ideological alignment of news sources had a stronger impact on vaccine attitudes.

Whether conspiracy theorists actively seek out misinformation or people with higher levels of conspiracy thinking are simply more willing to accept conspiratorial claims, some attraction to alternative explanations appears to be a key ingredient in conspiracy belief (Enders et al., 2023).

MacKay et al. (2022) found that public health campaigns failed to engage vaccine-hesitant communities, much like Malik et al. (2021) and James et al. (2023), who observed that public health messaging remains largely one-directional. This lack of engagement means that those who distrust institutions are unlikely to encounter credible counterarguments to their views, leaving misinformation to spread unchecked in closed ideological spaces.

The echo chamber phenomenon has been highly observed within political discussions, as users tend to share misinformation that aligns with their political views and discard information that contradicts it (Hadlington et al, 2023).

While partisanship often influences belief in misinformation, Viswanath et al. (2021) suggest that habitual information-sharing behaviors may be just as important as political bias in explaining how misinformation spreads. Their findings align with research indicating that habitual news sharers may spread false information unintentionally, simply because they are accustomed to sharing high-engagement content without verifying it.

What can be Done Against Misinformation

The Need for Stronger Misinformation Countermeasures

A recurring theme in misinformation research is the urgent need for improved misinformation countermeasures. Malik et al. (2021) argue that both social media platforms and health organizations must enhance their strategies to identify and counter misinformation more effectively.

It is recommended to improve emergency communications in Canada through the use of targeted, platform-specific messaging (Chen et al., 2022). Despite efforts to reduce misinformation on platforms like YouTube, Ginossar et al. (2022) found that anti-vaccine and conspiracy theory videos continued to spread widely, underscoring the need for stricter content moderation policies.

Machine Learning Systems

Artificial intelligence and machine learning tools have become critical in detecting and combating misinformation online. Various models have been developed to identify fake news, misleading content, and plagiarism by analyzing text, network patterns, and visual cues.

Kao et al. (2024) propose a majority-based learning system that improves misinformation detection by integrating multiple ML classifiers such as Support Vector Machines (SVM), Long Short-Term Memory (LSTM), Random Forest (RF), and eXtreme Gradient Boosting (XGB). This approach improves accuracy by leveraging majority voting, which reduces errors that individual models might introduce. Unlike single-model detection methods, this system improves balanced accuracy and F1 scores, making it more robust for identifying fake news, plagiarized content, and deceptive advertising (Kao et al., 2024).

The study aligns with other research that advocates AI-based misinformation detection as a scalable solution. Fact-checking platforms and content moderation systems increasingly rely on automated classifiers to filter unreliable information in real-time. However, challenges remain, such as the adaptability of misinformation to evade detection, the ethical considerations of algorithmic moderation, and the balance between free speech and misinformation control (Buntain et al., 2024).

User-Centered Approaches

Recognizing that technological solutions alone are insufficient, Buntain et al. (2024) propose four user-centric countermeasures to mitigate misinformation:

The first one is correcting and debunking misinformation**.** Fact-checking websites, warning labels, and AI-powered detection tools help counter false information. Hartwig et al., (2024) suggest fact-checking is effective but limited, as entrenched beliefs often resist correction.

Enders et al. (2023) also found that misinformation corrections struggle to reach conspiracy-minded individuals.

The second one is media literacy and educational interventions. Educating users to recognize misinformation through platform indicators, lateral reading training, and AI-generated credibility assessments. Himelboim et al. (2023) emphasize that misinformation spreads more through emotional appeal than factual inaccuracies, suggesting that literacy programs should teach users to recognize emotional manipulation. This is similar to Viswanath et al. (2021), which found higher education levels correlated with lower misinformation sharing.

The third countermeasure is regarding transparency and algorithmic changes. Platforms should clarify how content is ranked, flagged, or moderated to build trust with users. Enders et al. (2023) advocate for algorithmic changes that reward accurate information rather than engagement-driven sensationalism.

Finally, reducing exposure to misinformation using content visibility adjustments. Himelboim et al. (2023) found that conspiracy theories gain traction when they remain highly visible, lowering their visibility can help mitigate their impact. Additionally, culturally sensitive interventions may improve effectiveness. Noman et al. (2024) found that cultural norms influence whether individuals challenge misinformation, suggesting that tailored interventions are necessary for diverse audiences.

Public Health Communication Strategies and Effectiveness

Public health agencies have faced significant challenges in effectively engaging audiences on social media. While institutions like the WHO, CDC, and NHS have maintained active social media presence, Malik et al. (2021) found that their communication strategies often fail to resonate with vaccine-hesitant audiences.

MacKay et al. (2022) noted that public health organizations receive higher engagement than government accounts, but their messaging lacks interactivity. James et al. (2023) argue that many agencies miss opportunities to proactively counter misinformation, often limiting their outreach to audiences who already trust them rather than engaging with skeptical users.

MacKay et al. (2022) further emphasized that empathetic, conversational, and visually engaging content generates higher public engagement. This aligns with research suggesting that counter-misinformation efforts must be interactive, narrative-driven, and audience-specific to be effective.

Ultimately, a combination of AI-driven misinformation detection, user education, and proactive public safety communication strategies is essential to mitigating misinformation's impact. However, these interventions must be continuously adapted to address evolving tactics used by misinformation networks.

Search Methodology

The research question is composed of 3 sub-questions, the first one is regarding how misinformation affected emergency response in Canada during the COVID-19 pandemic, the second part is focused on the factors that contribute to the spread of misinformation, and finally, what can be done to mitigate the impacts of misinformation during emergencies. Different searches were conducted for the different parts. These searches were first conducted on the platform EBSCO through the JIBC library, however backward and forward citations were huge contributors to the relevant literature as the research question was subjected to changes and refinement along the research way.

The first stage of the research of relevant literature for this paper began by conducting unstructured research using phrases like "misinformation and emergency management in Canada" as preliminary research, this was done to identify key terms and general themes within

the topic. As the research was conducted, the research scope was narrowed down from the impacts of misinformation on emergency response in Canada to the impacts of emergency response in Canada during the COVID-19 pandemic.

The research on databases was conducted in two parts, the first one focused on the research regarding the impacts of misinformation in emergency response during public health emergencies, and the second part focused on strategies to mitigate those impacts.

The first part began using these search terms in the title and abstract, (misinformation or disinformation or fake news) AND (social media or online or internet) AND (emergency response or crisis or disaster) AND (public health). This yielded 951 results. After the term "Canada" was added and the "peer-reviewed" filter was applied, the results were reduced to 24

The second research was conducted using these search terms in the title and abstract, (misinformation or disinformation or fake news) AND (emergency or crisis or disaster) AND (mitigation or prevention or reduction) AND social media. (misinformation or disinformation or fake news) was selected as the subject of the texts, the "peer-reviewed" filter was applied and the time period for the publication was limited to the last 5 years. This search provided 69 results.

Finally, through Google Scholar, a third search was conducted using these as the search terms, allintitle: misinformation OR disinformation AND emergency. This search provided 15 results

The total of records resulted in 108 texts that were screened based on title and subjects, and abstract when the title didn't provide enough information. Articles that referred to medical emergencies, health care professionals, and medical emergency response, were excluded, as well as results that didn't frame the impact of misinformation in the context of an emergency or study the impacts of misinformation in countries other than Canada.

After identifying duplicates and discarding publications whose content didn't contribute to answering the research question 29 documents were left. These articles were subjected to abstract review and applied the following eligibility criteria; for the first part, the results mainly concern the spread of misinformation, disinformation, fake news, rumors, or equivalent, the studies were done on the impacts of information propagated through social media only and in the contexts of ongoing public health emergencies.

For the second part, publications that didn't analyze or propose mitigation measurements or strategies to counter the impacts of misinformation and disinformation through social media or follow the previous criteria but focused on a specific geographic or political context were excluded. Finally, 10 articles were selected for a final review and analysis, the main inclusion criteria were the relevancy of their content to the research question, this was judged by how the studies were conducted (priority to empirical and case studies), how the results contribute to answering the research question, and how the results from each article relate with each other, aiming to find common themes and debates.

Finally, the other articles for review were found using backward and forward citations by identifying relevant discussions in the selected articles and authors. All the sources reviewed are publications in peer-reviewed academic journals or reports from reputable organizations to ensure reliability.

Results

The main impact of misinformation during COVID-19 on emergency response in Canada was the objections to public health policies aimed at preventing the spread of the virus and the eventual opposition to immunization. Research consistently demonstrates a strong link between media consumption patterns and resistance to public health policies, particularly among those

who rely on non-traditional or alternative media sources. The studies also showed that social media amplified conspiracy theories and broader distrust in government health policies.

The data analyzed and published by Statistics Canada (Government of Canada, 2021) regarding the interaction Canadians had with misinformation showed that encounters with misinformation were frequent as well as the practice of sharing the information without verifying its veracity.

The action of sharing misinformation seems to be motivated by different factors, one is engagement (Buntain et al., 2024), which can be linked to the increasing importance given to social media presence, especially after the pandemic, this can be associated with the statement by Ceylan et al. (2022) that the way social media platforms are structured rewards information sharing that grabs attention and creates traction (likes, shares, comments) leading people to create a habit to share information for the sake of staying active on social media, the motivators to share information might be also amplified by stress-inducing situations such as emergencies or disasters.

However, it is important to highlight that most of the people who share misleading information do so without ill intention as most of them consider the information to be true or beneficial to their ideals. The individuals who craft the messages seem to use more sophisticated methods like cross-platform sharing to overcome the algorithmic barriers of platforms like YouTube, and manipulative, emotional, and fear-inducing language to get more engagement (Ginossar et al., 2022). These tactics are especially effective because the information is spread among individuals who are already susceptible to misinformation and due to the echo chamber created in social media accurate information stays out of reach, users are “trapped” in digital spaces where their opinions are constantly being reinforced and validated, fueling conspiracy theories.

Crisis communicators must understand the complex factors contributing to the spread of misleading information to combat it effectively. Authors argue that this task must not only fall on the emergency manager's shoulders but also be the responsibility of the platforms to enhance their strategies to identify and moderate the information shared by their users. Machine learning systems can offer a practical solution, as they are based on artificial intelligence tools like moderation systems that identify and prevent misinformation from being shared and pushed by the algorithms. However, user-centered strategies, seem to be better perceived (Buntain et al., 2024) this refers to approaches that focus on media literacy, strengthening the platform's policies against misinformation, and proactive public safety communication strategies that are continuously being updated and adapted to address the evolving tactics and tools used to spread misinformation.

The literature on the topic is extensive and shows a consensus regarding the relevancy of the conversation about the impacts of misinformation on social media and the urgency to implement countermeasures to mitigate those impacts. The results also highlight the interdisciplinary nature of the discussion, even though the research was made with an emergency management focus, the results show how the topic is relevant to psychology, political science, economic sciences, sociology, and information and communication technologies.

Although, there are not that many studies regarding the different impacts misinformation had specifically on Canadian emergency response during the COVID-19 pandemic, analysis made on public health organization’s ways of communication and the interactions of the public with misinformation in Canada point to an interest in improvement regarding this issue.

Discussion

Crisis Communication and Strategies to Counter Misinformation in Canada

The findings from this research highlight the challenges misinformation presents during public health emergencies, such as the COVID-19 pandemic. Effective crisis communication strategies are necessary to counter misinformation, restore trust in public health institutions, and ensure the timely dissemination of accurate information. However, the rapid spread of false information on social media platforms necessitates a multifaceted approach that includes technological interventions, user-centered initiatives, and targeted communication strategies tailored to different demographics.

One of the most pressing concerns in Canada's emergency response is the role of social media platforms as both a source of information and a vector for misinformation (Chen et al., 2022; Government of Canada, 2021). Public health organizations must adopt proactive communication techniques, such as real-time engagement, myth debunking, and emotionally compelling narratives that counteract misleading content. Traditional approaches, where government agencies disseminate static information, have proven inefficient, particularly in reaching vaccine-hesitant communities (MacKay et al., 2022; James et al., 2023). Instead, interactive and participatory messaging that fosters engagement and trust is needed.

User-Centric Defense Against Misinformation

Media literacy interventions have proven successful in reducing misinformation susceptibility, particularly when they focus on practical skills such as lateral reading, verifying sources, and recognizing emotionally manipulative content. It is important to highlight the rapid technological advancements, AI-generated images, and videos have become a highly used tool in fabricating false information, and learning how to identify them is becoming increasingly important.

Media literacy interventions can be done through mass communication channels, an example of this is a video posted by CBS News on October 15, 2024, giving tips to the audience on how to spot fake images during Hurricane Milton (CBS News, 2024). It is important that the messages are shared using an educational, empathic, and non-condescending or judgmental tone, encouraging users to use too fact-checking and promote misinformation debunking. Giving users the tools to identify inaccurate information will reduce their vulnerability to misinformation.

Within media literacy campaigns, encouragement for habit disruption can be implemented too, inviting the public to pause and critically think about the source and the content they are about to share (Enders et al, 2023). This approach, however, requires a deeper understanding of human behavior during disasters, and the psychologically rewarding effects social media engagement has on frequent users.

An important update on the fact-checking matter is that on January 7th, 2025, Mark Zuckerberg, the chairman, chief executive officer, and controlling shareholder of Meta announced that they were getting rid of third-party fact-checking across Meta's social media platforms in the United States (Facebook, Instagram, and Threads), to adopt a Community Notes Program (Kaplan, 2025) similar to the approach used on Twitter. Being a form of crowdsourced fact-checking system in which the community decides when a post is potentially misleading and can add context or facts to posts, empowers the community to stay current and accountable. The main argument for choosing community notes is to avoid censorship of trivial content and limit legitimate political debate (Kaplan, 2025).

This can be counteractive as people with strong conspiracy theories and beliefs are more resistant to correction (Hartwig et al., 2024). Additionally, this choice can amplify the echo chamber phenomenon by leaving fact-checking to the members of the communities who already believe in false information or are more vulnerable to it.

Technological Advancements and the Evolving Nature of Misinformation

Although much of the literature reviewed is relatively recent (within the past five years), the fast-paced evolution of misinformation tactics necessitates continuous updates to countermeasures. AI-generated fake content, deepfake videos, and synthetic media continue to evolve, making it increasingly difficult to distinguish between truth and deception (Buntain et al., 2024). As misinformation generation tools improve, so too must the systems designed to detect them.

Machine learning-based detection systems, such as the majority-based learning system proposed by Kao et al. (2024), offer promising improvements in identifying and flagging misinformation in real time. However, adaptive misinformation tactics, such as cross-platform dissemination and the use of encrypted messaging apps, highlight the limitations of automated detection, especially during an emergency. Human oversight combined with AI-driven moderation works as a form to initially address this challenge.

Additionally, algorithmic transparency is crucial in curbing misinformation. Platforms must implement clear content moderation policies and explain why certain content is flagged or deprioritized (Enders et al., 2023).

Demographic Factors in Misinformation Susceptibility

Misinformation susceptibility is not uniform across demographics. The findings indicate that older adults tend to share more misinformation, likely due to a lack of digital literacy and higher reliance on Facebook—a platform where misinformation spreads easily due to its engagement-driven algorithms (Hadlington et al., 2023). However, exposure to print media has been linked to more accurate information consumption regarding public health measures (Jamieson & Albarracín, 2020).

Conversely, younger populations, who rely more on social media, perceive older adults as being more susceptible to misinformation, particularly on platforms like Facebook. Despite this perception, studies show that increased social media use is correlated with a higher likelihood of believing conspiracy theories, including those about the origins of COVID-19 and vaccine efficacy (Enders et al., 2023). This paradox underscores the need for age-targeted misinformation interventions, for older adults, enhancing digital literacy and critical thinking programs can help reduce misinformation sharing, and for younger users, fact-checking awareness campaigns and in-app misinformation warnings may be more effective.

Education level among adults in Canada between the ages of 15 and 54 years old, is not an influential factor in whether or not this demographic shares unverified information (Government of Canada, 2021) which leads to the conclusion that interventions must focus on broader indicators understanding that anyone can be susceptible to misinformation online.

Recommendations

While this research has provided significant insights into misinformation spread and mitigation strategies, several gaps remain. First, cross-platform misinformation sharing needs further examination. Many studies focus on individual platforms (e.g., Facebook, Twitter, YouTube), but misinformation often spreads strategically across multiple platforms to bypass moderation efforts (Ginossar et al., 2022; Himelboim et al., 2023). Understanding these cross-platform dynamics will help design more effective countermeasures.

Second, more research is needed on the psychological mechanisms that drive misinformation belief persistence. Studies show that correcting misinformation is challenging due to confirmation bias and motivated reasoning (Hartwig et al., 2024). Future research should explore how to frame corrective information in a way that resonates with skeptical audiences.

The next recommendation is the creation of guidelines for the public against misinformation during emergencies, this includes how to spot possible misinformation, ways to fact-check and resources, recognizing manipulative and fear-inducing language, identification of AI-generated images and videos, list of reliable sources of information during different types of emergencies and ways users can use social media to assist or support emergency responders, all of this, tailored to different demographics (seniors, teenagers, college students, parents, etc.) taking into consideration language and graphic elements that appeal to each of them. This can be paired with mental health campaigns addressing the excessive use of social media and the counterproductive effects of too much information consumption during emergencies on the user's emotional well-being.

Finally, further examination of misinformation in the Canadian context is necessary, as a country with a vast cultural diversity, it is necessary to tailor studies for the different communities that reside in Canada and can fall victim to misinformation for reasons regarding their cultural context. Much of the available literature on misinformation focuses on the U.S., limiting the applicability of findings to Canada's regulatory frameworks and unique media landscape, especially among minorities, these demographics face linguistic barriers that lead them to rely on unofficial sources of information (Adepoju et al., 2023).

Given Canada's stronger public trust in institutions relative to the U.S., different misinformation mitigation strategies may be required, however, minorities often mistrust the government, making them reluctant to follow the authority's advice (Adepoju et al, 2023). At the same time, any intervention regarding public health misinformation targeted at minority groups, like indigenous communities, must be done without understanding traditional and ancestral medical practices.

Conclusion

The spread of misinformation during public health emergencies, such as the COVID-19 pandemic, poses significant challenges to emergency response efforts in Canada. Social media platforms, while valuable for disseminating information, have also become the perfect ground for the rapid spread of false narratives, leading to vaccine hesitancy, distrust in public health institutions, and opposition to critical health policies. This paper has highlighted the importance of understanding the mechanisms through which misinformation spreads, including the role of social media algorithms, echo chambers, and the psychological factors that make individuals susceptible to false information.

To mitigate the impact of misinformation, a multifaceted approach is necessary. This includes improving public health communication strategies to engage diverse audiences, improving media literacy to empower individuals to critically evaluate information, and exploiting technological advancements, such as machine learning, to detect and flag false content in real time. Additionally, addressing demographic vulnerabilities, such as the digital literacy gap among older adults and the high social media usage among younger populations, is crucial for designing effective interventions.

The findings underscore the urgent need for coordinated efforts between public health agencies, social media platforms, and the public to combat misinformation. By adopting proactive, user-centric, and technologically informed strategies, Canada can better prepare for future public health emergencies, ensuring that accurate information prevails and public trust in institutions is maintained.

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