

Social Media Health Misinformation and Vaccine Hesitancy Among Young Adults: A Systematic Review of Observational Evidence

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ABSTRACT

Background: Social media became a major source of health information during the COVID-19 pandemic while simultaneously enabling rapid dissemination of inaccurate or misleading vaccine claims. Young adults may be particularly exposed because social platforms occupy a prominent role in their information environments. **Methods:** This systematic review synthesized high-quality evidence available through 31 December 2022 concerning the relationship between social-media health misinformation and vaccine hesitancy, with particular emphasis on young adults and university-age populations. Peer-reviewed evidence from Q1 journals was examined across observational surveys, social-media analyses, ecological studies, and systematic reviews. **Results:** The evidence consistently showed that belief in vaccine misinformation, reliance on less-regulated social-media sources, conspiracy beliefs, and institutional distrust were associated with reduced vaccine confidence or uptake. In one vulnerable adult population, each additional COVID-19 conspiracy theory endorsed was associated with 51% greater odds of vaccine hesitancy. Population-level analyses found that higher online misinformation was associated with lower vaccination uptake even after adjustment for political, demographic, and socioeconomic factors. **Conclusion:** Social-media content studies demonstrated that safety concerns, efficacy doubts, conspiracy narratives, and material imitating scientific or journalistic presentation were prominent features of antivaccine misinformation. However, direct observational evidence restricted exclusively to young adults remained comparatively limited, and social-media use alone was an imprecise proxy for misinformation exposure. The evidence supports a credible relationship between misinformation belief and vaccine hesitancy, but future research should distinguish exposure, engagement, belief, and behavioral uptake using longitudinal designs.

Keywords: vaccine hesitancy; social media; misinformation; young adults; COVID-19 vaccination; conspiracy beliefs; vaccine confidence; health communication

1. Introduction

Vaccine hesitancy is commonly understood as delay in acceptance or refusal of vaccination despite the availability of vaccination services. It is influenced by confidence, complacency, convenience, social context, perceived vaccine safety, trust, and previous healthcare experiences [1]. The emergence of social media added another layer to this environment by allowing health information to circulate rapidly among users without traditional editorial or professional gatekeeping.

The COVID-19 pandemic intensified this problem. Social platforms simultaneously provided rapid access to public-health information and facilitated large-scale circulation of conspiracy theories, misleading safety claims, unsupported efficacy concerns, and distorted interpretations of emerging scientific evidence. A major scoping review of social-media research during COVID-19 identified misinformation and the broader infodemic as recurring public-health themes, demonstrating the central role of social platforms in both information dissemination and information disorder [2].

The distinction between social-media exposure and misinformation exposure is critical. A young adult may use social media extensively while primarily following reliable public-health, scientific, or clinical sources. Conversely, a relatively infrequent user may encounter highly persuasive false information. Therefore,

platform use itself should not be interpreted as a direct causal exposure.

Wilson and Wiysonge found a significant international relationship between social-media organization and public concerns regarding vaccine safety, while exposure to coordinated foreign disinformation was associated with vaccination outcomes [3]. Their findings predated widespread COVID-19 vaccination and suggested that online information environments could influence vaccine confidence at population level.

The pandemic subsequently produced more detailed evidence. Pierri et al. showed that online vaccine misinformation across the United States was negatively associated with vaccination uptake and positively associated with vaccine hesitancy, even after adjustment for political, socioeconomic, and demographic factors [4]. Their temporal analyses also provided evidence consistent with a directional relationship from misinformation toward hesitancy, although observational data cannot definitively establish causality.

Young adults are particularly important because university and early-adulthood periods involve increased independence in healthcare decisions while social-media use often remains prominent. A 2022 study of 827 university students found that 64% reported having received a COVID-19 vaccine, 23% remained willing, 5% refused, and 8% were uncertain; definite hesitancy

among evaluable students was 5%, with concern about vaccine adverse effects strongly associated with hesitancy [5].

The present review therefore aimed to synthesize evidence available through 2022 concerning social-media misinformation and vaccine hesitancy, with particular attention to young adults. It sought to distinguish platform use from misinformation exposure, identify the misinformation themes most consistently associated with hesitancy, examine the role of trust and conspiracy beliefs, and assess the strength of evidence connecting online misinformation with actual vaccine behavior.

2. Methods

2.1 Study Design

A structured systematic review of observational evidence was undertaken using literature available through 31 December 2022. The review was designed around the exposure pathway from social-media information environments to misinformation exposure or belief and subsequently to vaccine confidence, intention, or uptake.

Search concepts included combinations of social media, vaccine misinformation, health misinformation, COVID-19 vaccine, vaccine hesitancy, young adults, university students, conspiracy beliefs, vaccine confidence, vaccination intention, vaccine uptake, Twitter, Facebook, and YouTube.

Direct observational evidence involving young adults or university students was prioritized. Broader adult studies were included where they directly examined misinformation belief, social-media information sources, trust, or vaccine behavior and therefore informed mechanisms relevant to younger populations.

The eligibility framework is summarised in Table 1.

2.2 Outcome Definitions

Vaccine hesitancy was accepted when studies measured refusal, uncertainty, reduced intention, delayed acceptance, low vaccine confidence, or validated hesitancy scales. Actual vaccination uptake was treated as a stronger behavioral endpoint than intention, but the two were not considered interchangeable.

Social-media misinformation exposure was also separated conceptually into four levels: potential exposure to misinformation, active engagement with misinformation, belief in misinformation, and behavioral consequences. This distinction was necessary because a social-media user may encounter inaccurate material without accepting it.

2.3 Synthesis Strategy

Formal meta-analysis was not undertaken because the evidence contained incompatible measures, including odds ratios, vaccination percentages, ecological correlations, platform-content frequencies, vaccine-attitude scores, and qualitative or computational indicators of misinformation. Combining such outcomes into a common pooled effect would produce misleading precision.

3. Results

3.1 Overall Evidence Pattern

The evidence consistently indicated that vaccine misinformation circulated extensively on social media and that greater belief in misinformation or reliance on less-regulated social sources was associated with higher vaccine hesitancy. However, studies measuring generic social-media use showed more variable results than studies measuring misinformation beliefs directly.

Principal pre-2023 evidence is summarised in Table 2.

Pierri et al. provide particularly important behavioral evidence because their analysis connected online misinformation not simply to discussion but to actual regional vaccination rates. Misinformation exposure remained associated with vaccination

outcomes after accounting for multiple political and socioeconomic characteristics [4].

3.2 Misinformation Content on Social Media

Antivaccine information was not limited to a single type of claim. Ngai et al. examined misinformation drawn from major fact-checking databases and found that safety concerns were the most prominent content theme, alongside conspiracy and efficacy narratives. Posts commonly used conversational language or attempted to imitate the appearance and wording of scientific and journalistic reporting. Material that mimicked scientific or news language was positively associated with likes, suggesting that the appearance of authority can increase engagement with false information [10].

Muric et al. constructed a major public Twitter dataset containing more than 1.8 million keyword-centered vaccine tweets and historical activity from approximately 70,000 accounts engaged with antivaccine narratives. Their work showed that antivaccine discourse could be studied as a large, structured information ecosystem rather than as isolated false statements [9].

Hernandez et al. similarly analyzed approximately one million COVID-19 vaccine-related tweets and identified strongly polarized vaccine conversations. Fewer than 10% of analyzed tweets originated from the medical community, while political and nonmedical users played substantial roles in influential discourse [13].

Major misinformation themes and their likely relationship with hesitancy are summarised in Table 3.

3.3 Trust, Conspiracy Beliefs, and Vaccine Hesitancy

Trust emerged repeatedly as a major factor connecting information environments with vaccine decisions. Jennings et al. found that distrust in vaccines and government strongly predicted COVID-19 vaccine hesitancy in the United Kingdom. Individuals obtaining COVID-19 information from comparatively unregulated sources such as YouTube were also less willing to accept vaccination, while conspiracy beliefs and low perceived disease threat contributed to hesitancy [6].

This suggests that misinformation may often act through pre-existing distrust rather than functioning as a completely independent influence. Users who already distrust institutions may be more likely to seek, accept, or share misinformation, while repeated misinformation exposure may further deepen distrust.

Roozenbeek et al. similarly demonstrated substantial international variation in susceptibility to COVID-19 misinformation and showed that greater susceptibility was associated with lower compliance with health guidance and weaker vaccination intentions [14]. Allington et al. found consistent associations between conspiracy beliefs, particular patterns of social-media use, and lower engagement with health-protective behaviors. Their work supports the broader interpretation that online misinformation can influence health behavior through belief structures rather than exposure alone [15].

3.4 Evidence Relevant to Young Adults

Evidence confined strictly to young adults was less extensive than general-adult evidence. Webb et al.'s university sample provides one of the clearest relevant studies. Among 827 undergraduate participants, 64% had already received a COVID-19 vaccine, 23% remained willing to receive one, 5% reported refusal, and 8% were uncertain. Among evaluable students, definite hesitancy was 5%. Concerns about adverse effects were independently associated with hesitancy, with an adjusted odds ratio of 1.72 [5].

This relatively low hesitancy prevalence also demonstrates why university students should not be stereotyped as uniformly vulnerable to misinformation. The relevant question is not whether young adults use social media frequently, but whether their online information environments increase belief in particular misleading claims.

Evidence from broader populations supports this distinction. Strathdee et al. found that citing social media as the most important COVID-19 information source was independently associated with vaccine hesitancy in a vulnerable adult sample. More importantly, endorsement of COVID-19 disinformation demonstrated a dose-response relationship: each additional conspiracy theory endorsed was associated with 51% greater odds of hesitancy (aOR 1.51; 95% CI 1.31–1.74) [8].

3.5 Misinformation Belief Versus Information Overload

Lin et al. studied 6,034 respondents across six societies in Asia, Europe, and North America. Their findings showed that misinformation belief and information overload should not be treated as equivalent phenomena. Belief in vaccine misinformation reduced vaccine acceptance and uptake, whereas information overload itself did not produce the same pattern. Higher socioeconomic status attenuated some of the negative association between misinformation and vaccination behavior [7]. This distinction is central to the present review. High volumes of health information may create confusion, but the more direct risk factor appears to be acceptance of false or misleading claims.

The proposed pathway linking social-media vaccine misinformation with vaccine hesitancy among young adults is presented in Figure 1.

3.6 Association With Actual Vaccination Uptake

Studies measuring actual vaccination behavior provide stronger evidence than studies measuring intention alone. Pierri et al. combined social-media misinformation measures with US vaccination and survey data. Higher misinformation prevalence was associated with lower vaccination uptake and higher hesitancy. The relationships remained significant after adjustment for major demographic, political, and socioeconomic characteristics [4].

Wilson and Wiysonge had previously demonstrated an international association between online vaccine discourse, disinformation, and vaccination attitudes or rates [3]. Although these ecological studies cannot determine whether a particular individual encountered misinformation and consequently refused vaccination, they demonstrate that misinformation-rich information environments correlate with population vaccination behavior.

3.7 Evidence From Systematic Reviews

The 2022 rapid review by Skafle et al. concluded that existing studies generally suggested a negative relationship between social-media misinformation and vaccine hesitancy or uptake, while emphasizing the need for more rigorous experimental and longitudinal designs [11].

Cascini et al. similarly reviewed social media and COVID-19 vaccination attitudes and found that online platforms could influence vaccine attitudes in both positive and negative directions. This is important because social media itself is not inherently antivaccine; the platform can distribute misinformation but can also deliver corrective information and trusted public-health communication [12].

The strengths and limitations of the principal evidence types are summarised in Table 4.

Triangulation of pre-2023 evidence linking online misinformation with vaccine hesitancy is presented in Figure 2.

4. Discussion

4.1 Principal Findings

The central finding of this review is that social-media vaccine misinformation is credibly associated with vaccine hesitancy, but the association is more accurately described as misinformation belief and misinformation-rich information environments influencing hesitancy than as social-media use itself causing vaccine refusal.

The distinction resolves several apparently inconsistent findings. Millions of young adults use social media without becoming vaccine hesitant. Conversely, users who repeatedly encounter and accept misinformation may develop stronger safety concerns, conspiracy beliefs, or distrust.

This pattern is supported by individual-level and population-level data. Strathdee et al. identified a clear relationship between greater conspiracy endorsement and vaccine hesitancy [8], Lin et al. demonstrated lower vaccine acceptance among respondents believing misinformation [7], and Pierri et al. linked online misinformation prevalence with actual regional vaccine uptake [4].

4.2 Causal Interpretation

Observational evidence alone cannot establish that misinformation causes vaccine refusal. Several alternative pathways are possible. Vaccine-hesitant individuals may actively seek antivaccine material. Political or institutional distrust may independently increase both exposure to misinformation and vaccine refusal. Social-media recommendation systems may subsequently reinforce pre-existing attitudes.

However, experimental evidence strengthens causal plausibility. Loomba et al. randomized participants in the United Kingdom and United States to vaccine misinformation or factual information. Among individuals who initially stated that they would definitely accept a COVID-19 vaccine, misinformation exposure reduced definite vaccination intention by 6.2 percentage points in the UK and 6.4 percentage points in the US [16]. This does not establish that every real-world social-media exposure causes an equivalent decline in uptake. It does demonstrate that vaccine misinformation itself can alter stated vaccine intention under controlled conditions.

4.3 Young Adults Require Specific Study

A major research gap is the relative scarcity of studies that simultaneously measured age-specific social-media exposure, verified misinformation exposure, misinformation belief, and vaccine behavior among young adults.

University-student studies frequently measure vaccine hesitancy and demographic predictors but do not objectively characterize the online information each participant consumed. Social-media studies, in contrast, can analyze millions of posts but generally cannot establish the age, beliefs, or vaccination behavior of every user. Future young-adult research should link these two evidence streams.

4.4 Safety Concerns as a Dominant Narrative

Safety concerns were one of the most consistent themes across student hesitancy and social-media misinformation research. Webb et al. found vaccine adverse-effect concern to be independently associated with hesitancy among university students [5]. Ngai et al. found safety claims to be the most prominent misinformation content theme within their verified misinformation sample [10].

This convergence is important because misinformation may be particularly persuasive when it attaches itself to legitimate uncertainty. Vaccines can produce adverse effects, but misleading content may exaggerate frequency, misattribute unrelated events, remove absolute-risk context, or imply that rare events are being systematically concealed. Corrective communication should therefore address the underlying concern rather than merely labeling the individual as misinformed.

4.5 Trust as a Central Mediator

The findings suggest that vaccine misinformation cannot be addressed purely as an information-deficit problem. Providing additional facts may have limited effect when the recipient distrusts the institution providing them.

Jennings et al. demonstrated that institutional distrust and conspiracy beliefs strongly predicted vaccine hesitancy [6]. Lin et al. further showed that the effect of misinformation varied according to structural and cultural context [7]. Consequently,

communication interventions should seek to strengthen source credibility, transparency, and dialogue rather than simply increase message volume.

4.6 The Social Endorsement Problem

Social-media misinformation differs from static misinformation because users observe not only the claim but also indicators of social endorsement. Likes, comments, reposts, follower counts, and apparent consensus can influence how credible or socially accepted information appears.

Ngai et al.'s finding that misinformation formatted to resemble scientific or journalistic reporting could receive greater engagement illustrates how presentation modifies dissemination [10]. This suggests that misinformation interventions must consider both content and platform architecture.

4.7 Implications for Universities

Universities represent an important environment for vaccine communication because they combine dense young-adult populations with institutional healthcare, academic expertise, and digital communication infrastructure.

The evidence does not support replacing professional communication with generic anti-misinformation campaigns. Instead, universities should make credible vaccine information readily accessible through the same digital environments students already use. Webb et al. found substantial student support for campus-based vaccine delivery, indicating that communication and access can be integrated [5].

The evidence-informed university communication framework is presented in Table 5.

4.8 Strengths and Limitations

This review separates social-media use from misinformation exposure and misinformation belief, which is essential for avoiding oversimplified causal claims. It also prioritizes behavioral uptake when available and explicitly distinguishes evidence involving young adults from broader adult evidence.

The principal limitation is that direct young-adult observational evidence remained comparatively sparse through 2022. Many studies were cross-sectional and susceptible to reverse causation. Self-reported social-media exposure can be inaccurate, while ecological analyses cannot establish individual exposure. Vaccine hesitancy definitions also differed substantially among studies.

A second limitation concerns platform data. Twitter and Facebook research may overrepresent publicly accessible content while underrepresenting misinformation circulating in closed groups, encrypted messaging services, or short-form video platforms.

A third limitation is that most evidence relates to COVID-19 vaccination. The relationship between social-media misinformation and hesitancy may differ for HPV, influenza, meningococcal, MMR, or future vaccines.

4.9 Future Research

Future studies should recruit young adults prospectively and measure actual platform exposure over time. Participants could consent to provide social-media feeds or digital trace data, allowing researchers to quantify exposure to verified misinformation rather than rely solely on self-report.

The same participants should then undergo repeated measurement of misinformation belief, institutional trust, vaccine safety perceptions, intention, and verified vaccination behavior. Such a design would permit temporal modeling of the sequence from exposure to belief to hesitancy to actual uptake.

Researchers should also test whether particular misinformation characteristics are especially influential, including emotional language, false scientific authority, peer endorsement, repeated exposure, short-form video, and algorithmic recommendation.

5. Conclusion

High-quality evidence available through 2022 supports a meaningful relationship between social-media vaccine misinformation and vaccine hesitancy.

The relationship is strongest when exposure is measured through belief in misinformation, reliance on unreliable information sources, conspiracy endorsement, or misinformation-rich online environments, rather than generic social-media use.

Young adults remain an especially important population because their health decisions occur within highly digital information environments, yet direct age-specific evidence remains insufficiently developed.

The available research suggests a pathway in which misinformation interacts with safety concerns, conspiracy beliefs, institutional distrust, social endorsement, and perceived disease risk to reduce vaccine confidence and, in some settings, vaccine uptake.

Population-level findings linking misinformation with lower vaccination rates and experimental findings showing measurable reductions in vaccine intention strengthen the plausibility of this relationship.

The appropriate public-health response is therefore not simply to discourage social-media use. Social platforms are also valuable mechanisms for health communication. The more defensible strategy is to improve the quality, credibility, visibility, and responsiveness of vaccine information within digital environments, while strengthening young adults' ability to identify misleading claims and providing trusted opportunities to discuss genuine vaccine concerns.

Declarations

Funding

No external funding was received.

Conflict of Interest

The authors declare no conflict of interest.

Ethical Approval

Not applicable because this study synthesized previously published evidence and involved no direct participant recruitment.

Consent to Participate

Not applicable.

Data Availability

No novel participant-level dataset was generated.

Author Contributions

The authors contributed to conceptualization, evidence synthesis, interpretation, manuscript preparation, and critical revision.

References

1. MacDonald NE, SAGE Working Group on Vaccine Hesitancy. Vaccine hesitancy: definition, scope and determinants. *Vaccine*. 2015;33(34):4161-4164. doi:10.1016/j.vaccine.2015.04.036.
2. Tsao SF, Chen H, Tisseverasinghe T, Yang Y, Li L, Butt ZA. What social media told us in the time of COVID-19: a scoping review. *Lancet Digit Health*. 2021;3(3):e175-e194. doi:10.1016/S2589-7500(20)30315-0.
3. Wilson SL, Wiysonge C. Social media and vaccine hesitancy. *BMJ Glob Health*. 2020;5(10):e004206.
4. Pierri F, Perry BL, DeVerna MR, Yang KC, Flammini A, Menczer F, et al. Online misinformation is linked to early COVID-19 vaccination hesitancy and refusal. *Sci Rep*. 2022;12(1):5966. doi:10.1038/s41598-022-10070-w.
5. Webb A, Gogoi M, Weidman S, Woolf K, Zavala M, Ladhani SN, et al. Cross-sectional study of university students' attitudes to on-campus delivery of COVID-19, MenACWY and MMR vaccines and future-proofing vaccine roll-out strategies. *Vaccines*. 2022;10(8):1287. doi:10.3390/vaccines10081287.
6. Jennings W, Stoker G, Bunting H, Valgarðsson VO, Gaskell J, Devine D, et al. Lack of trust, conspiracy beliefs, and social media use predict COVID-19 vaccine hesitancy. *Vaccines*. 2021;9(6):593. doi:10.3390/vaccines9060593.
7. Lin F, Chen X, Cheng EW. Contextualized impacts of an infodemic on vaccine hesitancy: the moderating role of socioeconomic and cultural factors. *Inf Process Manag*. 2022;59(5):103013. doi:10.1016/j.ipm.2022.103013.
8. Strathdee SA, Abramovitz D, Harvey-Vera A, Vera CF, Rangel G, Artamonova I, et al. Correlates of coronavirus disease 2019 vaccine hesitancy among people who inject drugs in the San Diego-Tijuana border region. *Clin Infect Dis*. 2022;75(1):e726-e733. doi:10.1093/cid/ciab975.
9. Muric G, Wu Y, Ferrara E. COVID-19 vaccine hesitancy on social media: building a public Twitter data set of antivaccine content, vaccine misinformation, and conspiracies. *JMIR Public Health Surveill*. 2021;7(11):e30642. doi:10.2196/30642.
10. Ngai CSB, Singh RG, Yao L. Impact of COVID-19 vaccine misinformation on social media virality: content analysis of message themes and writing strategies. *J Med Internet Res*. 2022;24(7):e37806. doi:10.2196/37806.
11. Skafle I, Nordahl-Hansen A, Quintana DS, Wynn R, Gabarron E. Misinformation about COVID-19 vaccines on social media: rapid review. *J Med Internet Res*. 2022;24(8):e37367. doi:10.2196/37367.
12. Cascini F, Pantovic A, Al-Ajlouni YA, Failla G, Puleo V, Melnyk A, et al. Social media and attitudes towards a COVID-19 vaccination: a systematic review of the literature. *EClinicalMedicine*. 2022;48:101454. doi:10.1016/j.eclinm.2022.101454.
13. Hernandez RG, Hagen L, Walker K, O'Leary H, Lengacher C. The COVID-19 vaccine social media infodemic: healthcare providers' missed dose in addressing misinformation and vaccine hesitancy. *Hum Vaccin Immunother*. 2021;17(9):2962-2964. doi:10.1080/21645515.2021.1912551.
14. Roozenbeek J, Schneider CR, Dryhurst S, Kerr J, Freeman ALJ, Recchia G, et al. Susceptibility to misinformation about COVID-19 around the world. *R Soc Open Sci*. 2020;7(10):201199. doi:10.1098/rsos.201199.
15. Allington D, Duffy B, Wessely S, Dhavan N, Rubin J. Health-protective behaviour, social media usage and conspiracy belief during the COVID-19 public health emergency. *Psychol Med*. 2021;51(10):1763-1769. doi:10.1017/S003329172000224X.
16. Loomba S, de Figueiredo A, Piatek SJ, de Graaf K, Larson HJ. Measuring the impact of COVID-19 vaccine misinformation on vaccination intent in the UK and USA. *Nat Hum Behav*. 2021;5(3):337-348. doi:10.1038/s41562-021-01056-1.

Table 1. Eligibility framework

Domain	Inclusion criteria	Exclusion criteria
Publication period	Published on or before 31 December 2022	2023 onward
Journal quality	Q1 journal in a relevant field	Lower-quartile or unranked journals
Population	Young adults, university students, or general adults where mechanism was directly relevant	Populations unrelated to vaccine decision-making
Exposure	Social media, vaccine misinformation, conspiracy beliefs, unreliable information sources	Traditional media without social/digital relevance
Outcome	Vaccine hesitancy, confidence, intention, refusal, or uptake	Awareness without attitudinal or behavioral relevance
Design	Cross-sectional, longitudinal, ecological, content-analysis, systematic review	Unsupported commentary
Vaccines	COVID-19 or other vaccines where findings informed vaccine hesitancy	Non-vaccine health misinformation
Primary distinction	Exposure, engagement, belief, or source reliance	Studies treating all social-media use as identical

Table 2. Principal pre-2023 evidence

Study	Population/data	Exposure	Main finding
Wilson & Wiysonge [3]	International country-level data	Social-media activity and disinformation	Online organization/disinformation associated with vaccine-safety doubt and vaccination outcomes
Jennings et al. [6]	UK adults	Social-media sources, conspiracy beliefs, trust	Lower institutional trust and use of less-regulated platforms associated with hesitancy
Pierri et al. [4]	US states/counties	Online vaccine misinformation	Higher misinformation associated with greater hesitancy and lower vaccine uptake
Lin et al. [7]	6,034 residents across six societies	Misinformation belief	Misinformation belief reduced vaccine acceptance and uptake
Strathdee et al. [8]	393 adults in US-Mexico border region	Social-media reliance and conspiracy beliefs	Each additional conspiracy belief associated with aOR 1.51 for hesitancy
Webb et al. [5]	827 university students	Vaccine beliefs and demographic factors	5% definite COVID-19 vaccine hesitancy; side-effect concerns associated with hesitancy
Muric et al. [9]	>1.8 million vaccine-related tweets plus historical accounts	Antivaccine content	Demonstrated large-scale online infrastructure for vaccine misinformation
Ngai et al. [10]	140 verified misinformation posts	Content theme and presentation	Safety concerns prominent; pseudo-scientific presentation increased engagement
Skafle et al. [11]	Rapid review	COVID-19 vaccine misinformation	Evidence generally indicated negative effects on hesitancy and uptake
Cascini et al. [12]	Systematic review	Social-media vaccine information	Social-media environment associated with vaccine attitudes in multiple settings

Table 3. Major misinformation themes and their likely relationship with hesitancy

Misinformation domain	Typical narrative	Likely hesitancy mechanism
Safety	Vaccines cause severe, hidden, or long-term harm	Raises perceived vaccination risk
Efficacy	Vaccines do not prevent meaningful disease	Reduces perceived benefit
Speed of development	Vaccines were developed “too quickly” to be safe	Undermines confidence in regulatory processes
Conspiracy	Vaccination serves hidden political or commercial goals	Amplifies institutional distrust
Fertility/reproduction	Vaccines threaten fertility or pregnancy	Creates high-salience personal risk
Scientific mimicry	False claims presented using scientific terminology	Increases perceived credibility
Anecdotal harm	Individual adverse events portrayed as causal evidence	Makes rare outcomes cognitively salient
Natural immunity	Infection portrayed as universally preferable to vaccination	Reduces perceived necessity
Institutional concealment	Governments or pharmaceutical companies allegedly suppress harms	Weakens corrective messaging
Identity narratives	Vaccination framed as political or group allegiance	Converts health choice into social identity

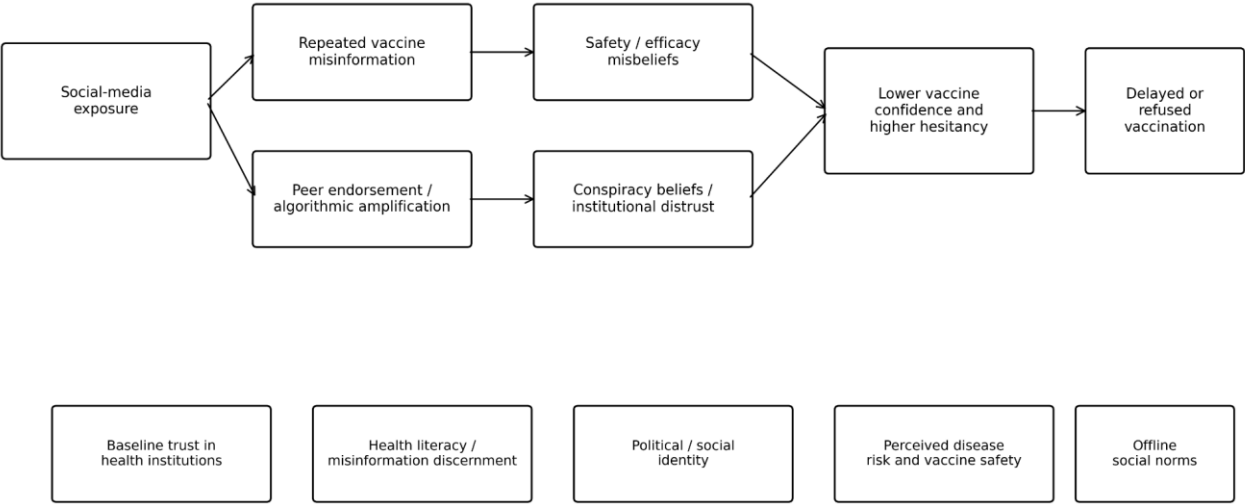
Table 4. Strengths and limitations of the principal evidence types

Evidence type	Principal strength	Principal limitation	Interpretation
Student surveys	Directly relevant to young adults	Usually cross-sectional	Useful for age-specific prevalence and correlates
General population surveys	Large samples and multivariable adjustment	Indirect for young adults	Strong mechanistic context
Social-media content analysis	Measures actual online information	Cannot determine individual belief	Establishes misinformation environment
Ecological vaccination studies	Links misinformation with real uptake	Ecological inference limitation	Supports population-level association
Longitudinal analyses	Establishes temporal sequence	Residual confounding remains	Stronger than cross-sectional evidence
Systematic reviews	Integrates diverse evidence	Underlying heterogeneity	Supports consistency of direction
Experimental exposure studies	Stronger causal inference	Measures short-term intention more often than uptake	Contextual support for causal mechanism

Table 5. Evidence-informed university communication framework

Domain	Recommended approach	Rationale
Information source	Use identifiable clinicians and subject experts	Improves source credibility
Safety communication	Present common, rare, and serious adverse effects with absolute risk	Addresses dominant misinformation theme
Uncertainty	State what is known and what remains uncertain	Prevents later updates appearing deceptive
Platform strategy	Use channels already used by students	Reduces information-access friction
Misconceptions	Address specific circulating claims	More relevant than generic reassurance
Social endorsement	Amplify credible peer and professional voices	Counters perceived antivaccine consensus
Dialogue	Permit questions rather than one-way messaging	Addresses distrust and uncertainty
Vaccine access	Combine information with accessible on-campus vaccination	Converts intention into behavior
Monitoring	Track emerging misinformation themes	Enables timely response
Evaluation	Measure uptake and confidence rather than engagement alone	Focuses intervention on health outcomes

Figure 1. Proposed pathway linking social-media vaccine misinformation with vaccine hesitancy among young adults



These factors act as confounders, mediators, or effect modifiers and should be measured explicitly rather than attributing hesitancy to platform use alone.

Figure 1. Proposed pathway linking social-media vaccine misinformation with vaccine hesitancy among young adults.

Social-media exposure creates opportunities for repeated misinformation, peer endorsement and algorithmic amplification. Safety and efficacy misbeliefs, conspiracy beliefs and institutional distrust represent more proximal mechanisms, while baseline trust, health literacy, political or social identity, perceived disease risk and offline social norms can act as confounders, mediators or effect modifiers.

Figure 2. Triangulation of pre-2023 evidence linking online misinformation with vaccine hesitancy

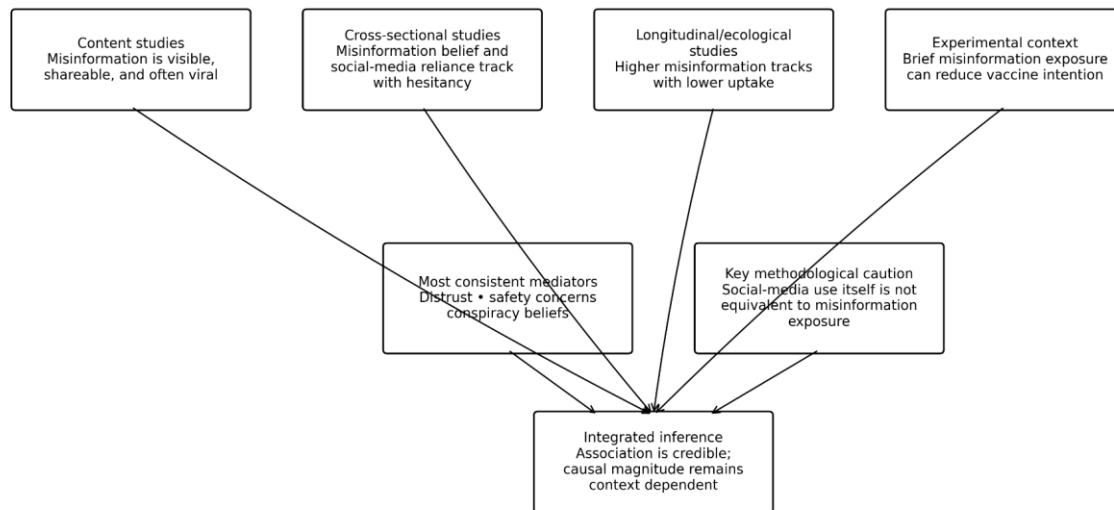


Figure 2. Triangulation of pre-2023 evidence linking online misinformation with vaccine hesitancy.

The strongest inference arises when content-level, individual-level, population-level and experimental findings converge. The evidence supports a credible association, while the causal magnitude remains context dependent and generic social-media use should not be treated as equivalent to misinformation exposure.

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