

Variation in Unmet Need for Healthcare by Perception of Social Media Health Mis- and Disinformation, Frequency of Social Media Use, Medical Trust, and Medical Care Discrimination: Cross-Sectional Study

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Abstract

Background: Unmet need for health care is defined as an individual choosing to postpone or completely avoid necessary medical treatment, despite have a need for health care, which can worsen current conditions or contribute to new health problems. The emerging infodemic can be a barrier that prevents people from accessing quality health information that could contribute to lower levels of seeking medical care when needed.

Objective: We evaluated the association between perceptions of health mis- and disinformation on social media and unmet need for health care. In addition, we evaluated mechanisms for this relationship, including frequency of social media use, medical trust, and medical care discrimination.

Methods: Data from 3,964 active adult social media users responding to the 2022 Health Information National Trends Survey 6 (HINTS 6), a nationally representative survey, were analyzed. The outcome was unmet need for medical care, defined as delaying or not getting medical care the participant needed. The predictor variables were perception of social media health mis- and disinformation, frequency of social media use, level of trust of the healthcare system, and perceived racial/ethnic discrimination when getting health care.

Results: Multivariable logistic regression models indicated that perception of substantial social media health mis- and disinformation (OR 1.40, 95% CI 1.07-1.82), daily use of social media (OR 1.34, 95% CI 1.01-1.79), low medical trust (OR 1.46, 95% CI 1.06-2.01), and perceived discrimination (OR 2.24, 95% CI 1.44-3.50) were significantly associated with a higher likelihood of unmet need for medical care. Unmet need among adults who did not use social media daily and who did not perceive substantial mis- and disinformation (24%; 95% CI 19%-30%) was lower compared to daily social media users that perceived substantial mis- and disinformation (38% 95% CI 32%-43%). Adults who perceived substantial mis- and disinformation and had low trust of healthcare had the highest probability of reporting unmet need (43% 95% CI 38%-49%) compared to the other three groups. Adults who perceived substantial mis- and disinformation and experienced medical care discrimination had a statistically significant higher probability of reporting unmet need (51% 95% CI 40%-62%) compared to adults who did not experience medical care discrimination and did not perceive substantial mis- and disinformation (29% 95% CI 26%-32%).

Conclusions: Unmet need for medical care was higher among persons who perceived a substantial degree of social media mis- and disinformation, especially among persons who use social media daily, do not trust the healthcare system, and experienced racial/ethnic discrimination when getting health care. To counter the negative effects of social media mis- and disinformation on unmet need for health care, public health messaging must focus on daily social media users and improving trust and reducing structural racism in the healthcare system.

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Variation in Unmet Need for Healthcare by Perception of Social Media Health Mis- and Disinformation, Frequency of Social Media Use, Medical Trust, and Medical Care Discrimination: Cross-Sectional Study

Running title: Health mis- and disinformation and unmet need for health care

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ABSTRACT

Background: Unmet need for health care is defined as an individual choosing to postpone or completely avoid necessary medical treatment, despite have a need for health care, which can worsen current conditions or contribute to new health problems. The emerging infodemic can be a barrier that prevents people from accessing quality health information that could contribute to lower levels of seeking medical care when needed.

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probability of reporting unmet need (43% 95% CI 38%-49%) compared to the other three groups. Adults who perceived substantial mis- and disinformation and experienced medical care discrimination had a statistically significant higher probability of reporting unmet need (51% 95% CI 40%-62%) compared to adults who did not experience medical care discrimination and did not perceive substantial mis- and disinformation (29% 95% CI 26%-32%).

Conclusions: Unmet need for medical care was higher among persons who perceived a substantial degree of social media mis-disinformation, especially among persons who use social media daily, do not trust the healthcare system, and experienced racial/ethnic discrimination when getting health care. To counter the negative effects of social media mis- and disinformation on unmet need for health care, public health messaging must focus on daily social media users and improving trust and reducing structural racism in the healthcare system.

Keywords: United States; Cross-Sectional Study; Trust; Consumer Health Information; Misinformation; Disinformation; Perceived Discrimination

INTRODUCTION

Unmet healthcare needs arise when someone with a known health issue skips or delays necessary medical treatment such as rescheduling appointments, refusing treatments, or avoiding preventive measures [1-3]. This can happen for various reasons, including cost or difficulty accessing care [4]. Unfortunately, unmet healthcare needs can lead to untreated conditions becoming worse or developing new health problems. Certain populations are more likely to have unmet need for care, such as persons with impairments, the elderly, marginalized racial and ethnic groups, and those without health insurance [5-8]. Systematic reviews have revealed areas that require further investigation [9-10]. For example, patient perceptions about the healthcare system and their own health conditions could be a significant factor contributing to unmet healthcare demands underscoring a potential intervention option to improve unmet healthcare needs and subsequently improve health outcomes [7,9].

Theoretical Framework

The health care utilization model developed by Anderson provides a strong foundation for analyzing the complex problem of unmet need for health care [11]. This model identifies several pathways that influence healthcare seeking and utilization: resources that facilitate helpseeking, perceived and assessed need for care, and predisposing qualities. Social structures, health attitudes, and demographic traits are examples of predisposing characteristics that may influence an individual's decision to use health services. The practical components of accessing care, such as the availability of health insurance, the accessibility of healthcare professionals, and socioeconomic position, are referred to as enabling resources. The choice to seek care is influenced by the patient's perception of need as well as the assessment of medical professionals. Finally, contextual factors such as public policies and the community environment can influence each of these

individual-level domains [7,11]

The way people receive, exchange, and act upon health information is greatly influenced by the communication infrastructure, which consists of networks, information technologies, and channels for both interpersonal and mediated communication [12]. In the Anderson model, the communication infrastructure can be viewed as a contextual factor that affects the predisposing qualities, enabling resources, and need factors. For instance, the information gleaned from many media sources may influence one's opinions about health and thereby influence their likelihood of seeking medical care [13-14].

The communication infrastructure also has an impact on enabling resources, which include the practical aspects of receiving treatment. People can choose when and where to seek care by having access to trustworthy communication channels and accurate health information [14]. The quality and accessibility of health information has a direct bearing on the demand for health care, which motivates the actual use of services [12]. Unmet health care needs might arise from underestimating health needs or from mistrusting the healthcare system due to inaccurate or incomplete information [14]. Furthermore, poor communication can make gaps in access to health care worse, especially for racial and ethnic minorities who do not have easy access to reliable health information [15]. By integrating the communication infrastructure into the Anderson model, we can gain a deeper understanding of the complex relationship among health literacy, information availability, and health care utilization.

Misinformation and Disinformation

The term "infodemic" describes the ongoing dissemination of false information and health-related falsehoods and it has emerged as a significant public health issue [16]. Research has shown that the spread of misinformation, which refers to spreading inaccurate health information, and disinformation, which refers to intentionally disseminating

false information, has had a negative effect on health-related behaviors and attitudes [17-21]. The dissemination of misinformation and disinformation via social media introduces a novel extension to the traditional Anderson model by representing a contextual factor influencing individual-level predisposing, enabling, and need factors. The frequency of social media use can either facilitate or hinder health care utilization, depending on the quality of information accessed and the user's level of engagement [22-24]. Disseminating inaccurate information can undermine public confidence in the healthcare system, which is crucial for accessing healthcare services and can influence the decision to seek medical attention [25-28]. Moreover, the intentional dissemination of inaccurate information and misinformation to communities of color and ethnic minorities worsens pre-existing disparities and perceptions of bias in the healthcare system, potentially leading to higher levels of unaddressed healthcare needs within these populations [20,29-30]. By integrating the communication infrastructure with Anderson model, we can understand the communication barriers that prevent people from accessing healthcare and to develop effective ways to mitigate the negative effects of health misinformation on public health [31].

Mechansims Linking Mis-and Disinformation and Health Care Utilization

The exposure to misinformation and disinformation on social media platforms can be connected to unmet healthcare requirements through various pathways, some of which have not been thoroughly studied in existing literature. The first mechanism pertains to the relationship between the utilization of social media and the level of engagment with material, specifically pertaining to false or misleading information [23]. Increased usage of social media correlates with a higher probability of individuals interacting with different forms of content, including deceptive or inaccurate information [32]. Exposure to this digital information environment can modify a person's beliefs and decision-making processes surrounding healthcare, potentially resulting in unmet need for medical care [33-34].

The second mechanism pertains to the confidence individuals place in healthcare institutions and professionals. Trust has a crucial role in influencing individuals' decision to seek healthcare services and adhere to the treatments recommended by healthcare providers [35]. Certain groups are less likely to trust credible health institutions like government health agencies or health systems, but misinformation can influence the level of trust regardless of group membership [36-38]. Nevertheless, the spread of false information on social media undermines this trust, leading individuals to lose confidence in the healthcare institution and not seek medical attention when necessary [39-42].

The third mechanism emphasizes the problem of unmet need for care among racial and ethnic minority groups, which is frequently worsened by discrimination inside the healthcare system [43]. Social media platforms can serve as conduits for disseminating health-related disinformation, often aimed at these specific communities [44]. The deliberate dissemination of false information, specifically aimed at racial and ethnic minoritized populations, along with experiences of discrimination, can further erode trust in healthcare and result in higher unmet need for healthcare [45-50]. These mechanisms collectively contribute to additional barriers in obtaining medical treatment. To effectively tackle the challenges presented by misinformation and its influence on public health, it is crucial to better understand how these mechanisms influence healthcare seeking and utilization.

Research Objective

By integrating the communication infrastructure into the Anderson model of healthcare utilization, our study aims to investigate the effects of the infodemic on healthcare utilization, proposing that exposure to misinformation about health is associated with a higher probability of delaying or avoiding necessary medical care. In addition, our goal is to investigate the underlying mechanisms of this association, such as the frequency

of social media use, the degree of trust that individuals have in the healthcare system, and the occurrence of racial/ethnic discrimination in healthcare settings. Our hypothesis is that people who perceive substantial false or misleading health information and use social media daily, have little trust in the healthcare system, and experience racial or ethnic discrimination when trying to get healthcare services are more likely to have unmet healthcare needs.

METHODS

Data

This cross-sectional study analyzed nationally representative data from the Health Information National Trends Survey 6 (HINTS 6), which periodically surveys non-institutionalized adults in the United States (US) about information seeking, health communication, and cancer prevention attitudes and behaviors. HINTS 6, the most recent version of the data, were collected as a mail and online survey from March to November 2022 with a response rate of 28.1%.[51] The data are publicly available and de-identified; therefore, the university human research protection program decided it did not require review by the institutional review board. Further details about the survey methodology are available from the National Cancer Institute.[51] We excluded participants that reported they do not use social media or have not used social media in the past year. We analyzed data from 3,964 adult social media users that have used social media in the past year with complete data on the study variables.

Measures

The binary outcome variable was unmet need for medical care, defined as delaying or not getting medical care that the participant believed was medically necessary. The primary predictor variable was perceptions about health mis- and disinformation on social

media, which was assessed by the following question: “How much of the health information that you see on social media do you think is false or misleading?”. The response categories were dichotomized for ease of interpretation as substantial (“a lot”) versus less than substantial (“none, a little, some”) consistent with past studies [20,29,37]. The secondary predictor variables suggested by the theoretical framework included frequency of social media use, trust of the healthcare system, and perceived racial and ethnic discrimination [11-13]. Social media use was categorized as daily use versus less than daily use (“never, weekly, monthly”). For medical trust, participants were asked “How much do you trust the health care system (for example, hospitals, pharmacies, and other organizations involved in health care)” and the response categories were dichotomized for ease of interpretation based on prior literature as high (“very” and “somewhat”) versus low (“not at all” and “a little”) [52-53]. For medical care discrimination, participants were asked “Have you ever been treated unfairly or been discriminated against when getting medical care because of your race or ethnicity?” and the response categories were yes or no.

The Andersen model for health care utilization was used to select the control variables.[11] Predisposing factors included age (18-49, 50-64, 65+), sex (male, female), marital status (married/cohabiting, formerly married, never married), self-reported race and ethnicity (non-Latino White, non-Latino Black, non-Latino Other, and Latino), education level (college degree or higher versus less than a college degree), and residence in a metropolitan versus nonmetropolitan county as designated by the US Department of Agriculture in 2013. Enabling factors included full-time employment status, feelings about household income (finding it very/difficult on present income, getting by on present income, living comfortably on present income), health insurance status (any insurance, uninsured), and frequency of health provider visits (0-3, 4+ annual visits). Need for health care was measured with self-rated overall health status (excellent/very good/good vs fair/poor).

Statistical Analysis

The descriptive statistics for the study sample were calculated as survey weighted percentages. The bivariable relationships between the outcome and the predictor variables were calculated with column percentages and adjusted Wald p-values. Then, we used a stepped multivariable logistic regression model to test for the main effects of perceptions of social media health mis- and disinformation on unmet need for health care. The first step adjusted for the secondary predictor variables of social media use, medical trust, and medical care discrimination, and the second model added adjustment for predisposing, enabling and need factors [11]. In addition to the main effects, an interaction effect was calculated between the primary predictor variable and the secondary predictor variables to estimate the theorized pathways between mis- and disinformation on social media and unmet need for health care in multivariable logistic regression models. The interaction results were converted into predicted probabilities using the margins command in Stata for ease of interpretation. Sensitivity analyses were conducted that excluded non-Latino White persons for the interaction effect of medical discrimination and perceived mis- and disinformation. All analyses accounted for survey weights and design using jackknife replicate weights for variance estimation. Statistical significance was set at $\alpha < .05$.

RESULTS

Table 1 provides the unadjusted sample size and survey weighted percentage points for all study variables among adult social media users in the past year. Most participants reported their health care needs were met (67%) while a third reported unmet need for health care (33%). More than a third of participants perceived substantial social media health mis-disinformation (36%). Most participants used social media daily (73%). Low healthcare system trust was reported by 17% of participants, and 8% reported experiencing

racial and/or ethnic discrimination when seeking health care.

Table 1: Unadjusted sample size and survey-weighted percentages for study variables from the 2022 Health Information National Trends Survey 6 (N=3,964)

	Raw N	Weighted %
Outcome		
Unmet Need for Medical Care		
No	2,655	67%
Yes	1,309	33%
Predictors		
Perception of Social Media Health Mis-Disinformation		
< Substantial	2,567	64%
Substantial	1,397	36%
Frequency of Social Media Use		
< Daily	1,161	27%
Daily	2,803	73%
Healthcare System Trust		
High	3,368	83%
Low	596	17%
Medical Care Discrimination		
No	3,616	92%
Yes	348	8%
Predisposing Factors		
Age		
18-49	1,751	59%
50-64	1,185	27%
65+	1,028	14%
Sex		
Male	1,475	47%
Female	2,489	53%
Marital Status		
Married/Cohabiting	2,208	57%
Formerly Married	928	10%
Never Married	828	33%
Rural/Urban Designation		
Nonmetro	489	12%
Metro	3,475	88%
Race/Ethnicity		
Non-Latino White	2,272	61%
Non-Latino Black	613	11%
Latino	725	18%
Non-Latino Other	354	10%
Education		
Not College Graduate	1,915	64%
College graduate or higher	2,049	36%
Enabling Factors		
Full Time Employment		
No	1,774	40%

Yes	2,190	60%
Feelings about Household Income		
Finding it very/difficult on present income	773	19%
Getting by on present income	1,453	37%
Living comfortably on present income	1,738	44%
Covered by Any Health Insurance		
No	337	11%
Yes	3,627	89%
Healthcare Provider Annual Visits		
0-3 visits	2,373	65%
4+ visits	1,591	35%
Need Factors		
General Health		
Fair/Poor	634	15%
Excellent/Very Good/Good	3,330	85%

Table 2 shows the survey weighted bivariable column percentages between the outcome and predictors, all of which were statistically significant. Among participants who perceived substantial social media mis- and disinformation, 42% reported unmet need compared to 33% who reported their need for care was met. Among participants who reported daily social media use, 77% reported unmet need compared to 71% who reported their need for care was met. Among participants who reported low trust of the healthcare system, 24% reported unmet need compared to 14% who reported their need for care was met. Among participants who experienced racial/ethnic discrimination when getting medical care, 13% reported unmet need compared to 5% who reported their need for care was met.

Table 2: Survey weighted bivariable column percentages between unmet need for medical care, perception of health mis- and disinformation on social media, frequency of social media use, trust of the health care system, and experience of racial/ethnic discrimination when getting medical care among adult social media users in the past year from the 2022 Health Information National Trends Survey 6 (N = 3964).

	Met Need for Medical Care, %	Unmet Need for Medical Care, %	P value ^a
Perceptions of social media health mis-disinformation			
< Substantial	67	58	.01
Substantial	33	42	
Frequency of Social Media Use			

< Daily	29	23	.02
Daily	71	77	
Healthcare System Trust			
High	86	76	< .001
Low	14	24	
Medical Care Discrimination			
No	95	87	< .001
Yes	5	13	

^a *P* values were calculated with the adjusted Wald χ^2 test.

In Table 3, the first model of the multivariable logistic regression shows the association of the predictor variables without adjustment for covariates. Perception of substantial social media health mis-and disinformation (OR 1.41, 95% CI 1.09-1.81), daily use of social media (OR 1.43, 95% CI 1.09-1.87), low healthcare system trust (OR 1.74, 95% CI 1.29-2.35), and perceived discrimination (OR 2.34, 95% CI 1.47-3.73) were all associated with a higher likelihood of unmet need for medical care. In model 2, after adjusting for predisposing, enabling, and need factors, perception of substantial social media health mis-and disinformation (OR 1.40, 95% CI 1.07-1.82), daily use of social media (OR 1.34, 95% CI 1.01-1.79), low healthcare system trust (OR 1.46, 95% CI 1.06-2.01), and perceived discrimination (OR 2.24, 95% CI 1.44-3.50) remained significantly associated with a higher likelihood of unmet need for medical care.

Table 3: Multivariable odds ratios (ORs) and 95% CIs for unmet need for medical care among social media users in the past year from the 2022 Health Information National Trends Survey 6 (N=3,964). Logistic regression models were adjusted for survey weight and design. Model 2 adds adjustments for age, gender, marital status, urban or rural designation, race and ethnicity, education, employment status, feelings about household income, health insurance coverage, number of health care provider visits, and general health status.

	Model 1	Model 2
Perception of Social Media Health Mis-Disinformation		
< Substantial		
Substantial	1.41 (1.09-1.81)	1.40 (1.07-1.82)
Frequency of Social Media Use		
< Daily		
Daily	1.43 (1.09-1.87)	1.34 (1.01-1.79)
Healthcare System Trust		

High		
Low	1.74 (1.29-2.35)	1.46 (1.06-2.01)
Medical Care Discrimination		
No		
Yes	2.34 (1.47-3.73)	2.24 (1.44-3.50)

Table 4 show the results from multivariable logistic models, adjusted for predisposing, enabling, and need factors, in which perception of mis-disinformation was multiplied by predictors hypothesized to be mechanisms of the relationship between unmet need for care and perception of mis-disinformation. There was a statistically significant difference in the probability of reporting unmet need for care among adults who did not use social media daily and who did not perceive substantial mis- and disinformation (24%; 95% CI 19%–30%) compared to daily social media users that perceived substantial mis- and disinformation (38% 95% CI 32%-43%). Adults who perceived substantial mis- and disinformation and had low trust of the healthcare system had the highest probability of reporting unmet need for care (43% 95% CI 38%-49%) compared to the other three groups. Adults who perceived substantial mis- and disinformation and experienced medical care discrimination had a statistically significant higher probability of reporting unmet need for care (51% 95% CI 40%-62%) compared to adults who did not experience medical care discrimination and did not perceive substantial mis- and disinformation (29% 95% CI 26%-32%). We conducted a sensitivity analysis for the interaction of medical care discrimination and perception of mis and disinformation in which we excluded non-Latino White participants yielding a sample size of 1,692. The results were replicated. Racial and ethnically minoritized adult social media users who perceived substantial mis- and disinformation and experienced medical care discrimination had a statistically significant higher probability of reporting unmet need for medical care (52% 95% CI 38%-67%) compared to racial and ethnically minoritized adult social media users who did not experience medical care discrimination and did not perceive substantial mis- and

disinformation (24% 95% CI 20%-28%).

Table 4. Multivariable-adjusted percentage points for unmet need for medical care and the interaction effect between perceptions of health mis- and disinformation on social media and frequency of social media use, healthcare system trust, medical care discrimination from the 2022 Health Information National Trends Survey 6 (N=3,964). Predicted marginal effects were calculated from multivariable logistic regression models that were adjusted for survey weight and design, age, gender, marital status, urban or rural designation, race and ethnicity, education, employment status, feelings about household income, health insurance coverage, number of health care provider visits, and general health status.

	Perceptions of health mis- and disinformation on social media	
	< Substantial	Substantial
Frequency of Social Media Use		
< Daily	24 (19-30)	36 (28-44)
Daily	33 (28-37)	38 (32-43)
Healthcare System Trust		
High	30 (24-36)	25 (18-32)
Low	31 (27-34)	43 (38-49)
Medical Care Discrimination		
No	29 (26-32)	36 (31-41)
Yes	49 (37-61)	51 (40-62)

DISCUSSION

Principal Findings

The primary objective of this study was to apply an extension of the Anderson model of healthcare utilization by evaluating the communication environment as a contextual determinant of healthcare seeking and utilization, which had not been specifically explored in prior studies [11-13]. Toward this end, we examined the association between perceptions of health mis- and disinformation on social media and unmet need for health care. We found that perception of substantial social media mis- and disinformation was associated with a higher probability of reporting unmet health care need compared to those who did not perceive substantial mis- and disinformation. This result is consistent with a growing body of literature demonstrating the negative impacts of social media health mis- and

disinformation on health outcomes.[16-19] Our findings suggest that the communication environment serves as a contextual determinant of seeking healthcare by exposing persons to false health information that is then associated with people delaying or avoiding medical care, even when it is needed, which could result in worse health outcomes [14]. Thus, perceptions of substantial health mis- and disinformation on social media may serve as one possible underlying mechanism for unmet need for health care.

In addition, we evaluated whether the relationship between perceptions of health mis- and disinformation on social media and unmet need for health care depended on the frequency of social media use, trust in the healthcare system, and experience of racial and ethnic discrimination in health care. We found unmet need was lower among adults who did not use social media daily and did not perceive substantial mis-disinformation compared to daily social media users that perceived substantial mis- and disinformation. This finding is consistent with our theoretical framework that integrated the Anderson model of healthcare utilization with the frameworks that view the communication environment as a social driver of health [11-12]. Our empirical findings and theoretical framework suggest that more time spent on social media increases the exposure to and engagement with mis- and disinformation, which can lead frequent daily social media users to be more likely to have false beliefs that lower their likelihood of seeking needed medical care [32-34].

For the second mechanism, adults with low trust of the healthcare system and who perceive substantial mis- and disinformation had the highest probability of reporting unmet health need. This finding is consistent with prior literature and our theoretical framework demonstrating a trend toward eroding trust in medical professionals and health institutions associated with social media health mis- and disinformation that influences harmful health behaviors and poor health outcomes.[36-42] Trust of the healthcare system is important for patient compliance with recommended care and seeking necessary medical care, and trust

is difficult to rebuild once lost suggesting this mechanism is critical for reducing the negative impact of unmet need for medical care.[4, 35]

Finally, adults who perceived substantial mis- and disinformation and experienced medical care discrimination had a higher probability of reporting unmet need for medical care compared to adults who did not experience medical care discrimination and did not perceive substantial mis- and disinformation. This finding is consistent with a large body of literature and our theoretical framework demonstrating the negative impacts of racial and ethnic discrimination experiences for seeking needed health care [43-50]. Our results and recent studies suggest that experiencing discrimination may have a complex relationship with social media health mis-disinformation by further reducing historical levels of low trust of healthcare institutions [43,52-53].

Limitations

There are several limitations to consider when interpreting the results. First, a non-response analysis of a prior iteration of HINTS from 2011 and 2013 suggested that estimates using measures on seeking health information may be higher than other surveys [54]. To mitigate this potential effect and increase the validity of the study results, we excluded persons who did not use social media and persons who had not visited a social media platform in the past year (during the study period). Of course, the findings are the result of a cross-sectional survey and therefore should not be interpreted to indicate a causal relationship. One final context for interpreting the findings is that this study is focused on social media health mis-and disinformation and the findings might not apply to mis- and disinformation in other health contexts.

Conclusion

Based on our expanded the Anderson version of healthcare utilization model, we found unmet need for health care was higher among persons who perceived a substantial

amount of social media mis- and disinformation, especially among persons who use social media daily, have a low trust of the healthcare system, and experienced racial/ethnic discrimination when getting health care. Our findings justify an expansion of the Anderson model of healthcare utilization by conceptualizing the communication environment a contextual determinant of seeking healthcare. Future research should continue to model the communication environment as a contextual determinant of healthcare utilization and further evaluate the mechanisms of exposure to health mis- and disinformation such as trust and discrimination. By extension, another area of future research is the role of digital literacy, which we did not measure in this study. Individuals possessing advanced digital literacy skills are more likely to have the ability to differentiate between reliable health information and misleading or false information and therefore digital literacy may influence the connection between social media usage and unmet healthcare need [55]. Another area of future research is the role that social media plays in the support networks for persons with specific health issues, perhaps mitigating or exacerbating the adverse impacts of misinformation and disinformation through peer-supplied information and emotional support, which could interact with trust and past experiences of discrimination [55].

To counter the negative effects of social media mis- and disinformation on unmet need for health care, tailored public health efforts on social media are needed that specifically target prevailing misunderstandings and offer fact-based information that has the potential to diminish the spread and consequences of health mis- and disinformation. As a component of this effort, healthcare institutions could actively monitor social media patterns to swiftly detect and address the emergence of health-related false and misleading information, potentially in real-time [55-56]. By implementing patient education programs that focus on developing health literacy, especially in the assessment of online health information, patients could be empowered to make well-informed healthcare choices [57].

Finally, healthcare institutions should continue to work toward building trust and reducing structural racism to mitigate the effects of mis- and disinformation and encourage patients to access health services when needed.



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Data Availability

The data sets generated during and/or analyzed during this study are available in the National Cancer Institute repository [XX].

Author Contributions

All authors contributed to the study conception and design. Data analysis was performed by Jim Stimpson. The first draft of the manuscript was written by Jim Stimpson. All authors contributed to subsequent drafts of the manuscript. All authors read and approved the final version of the manuscript.

Conflicts of Interest

The authors have no relevant financial or non-financial conflicts of interest to disclose.

Abbreviations

HINTS Health Information National Trends Survey

OR Odds Ratio

CI Confidence Interval

REFERENCES

1. Harrison JD, Young JM, Butow PN, Solomon MJ. Needs in Health Care: What Beast is That? *International Journal of Health Services*. 2013;43(3):567-585. doi:10.2190/HS.43.3.I
2. Chen J, Hou F. Unmet needs for health care. *Health Rep*. 2002 Jan 1;13(2):23-34.
3. Vreman RA, Heikkinen I, Schuurman A, Sapede C, Garcia JL, Hedberg N, Athanasiou D, Grueger J, Leufkens HG, Goettsch WG. Unmet medical need: an introduction to definitions and stakeholder perceptions. *Value in health*. 2019 Nov 1;22(11):1275-82.
4. Hawks L, Himmelstein DU, Woolhandler S, Bor DH, Gaffney A, McCormick D. Trends in unmet need for physician and preventive services in the United States, 1998-2017. *JAMA Intern Med*. 2020;180(3):439-448.
5. Park S, Stimpson JP. Trends in self-reported forgone medical care among Medicare beneficiaries during the COVID-19 pandemic. *JAMA Health Forum*. 2021;2(12):e214299. PMID: 35977302; PMCID: PMC8796880. <https://doi.org/10.1001/jamahealthforum.2021.4299>
6. Caraballo C, Ndumele CD, Roy B, Lu Y, Riley C, Herrin J, Krumholz HM. Trends in Racial and Ethnic Disparities in Barriers to Timely Medical Care Among Adults in the US, 1999 to 2018. *JAMA Health Forum*. 2022 Oct 7;3(10):e223856. doi: 10.1001/jamahealthforum.2022.3856. PMID: 36306118; PMCID: PMC9617175.
7. Hong YR, Samuels SK, Huo JH, Lee N, Mansoor H, Duncan RP. Patient-centered care factors and access to care: a path analysis using the Andersen behavior model. *Public Health*. 2019 Jun;171:41-49. doi: 10.1016/j.puhe.2019.03.020. Epub 2019 May 13. PMID: 31096161.
8. Park S, Stimpson JP. Unmet Need for Medical Care Among Fee-for-Service Medicare Beneficiaries with High and Low Need. *J Gen Intern Med*. 2023 Jul;38(9):2059-2068. PMID: 37095329; PMCID: PMC10361899. <https://doi.org/10.1007/s11606-023-08145-z>
9. Smith S, Connolly S. Re-thinking unmet need for health care: introducing a dynamic perspective. *Health economics, policy and law*. 2020 Oct;15(4):440-57.
10. Rahman MM, Rosenberg M, Flores G, Parsell N, Akter S, Alam MA, Rahman MM, Edejer T. A systematic review and meta-analysis of unmet needs for healthcare and long-term care among older people. *Health Economics Review*. 2022 Dec 9;12(1):60.
11. Andersen RM. Revisiting the behavioral model and access to medical care: does it matter? *J Health Soc Behav*. 1995 Mar;36(1):1-10. PMID: 7738325.
12. Goulbourne T, Yanovitzky I. The communication infrastructure as a social determinant of health: implications for health policymaking and practice. *The Milbank Quarterly*. 2021 Mar;99(1):24.
13. Richardson S, Lawrence K, Schoenthaler AM, Mann D. A framework for digital health equity. *NPJ digital medicine*. 2022 Aug 18;5(1):119.
14. Lyles CR, Nguyen OK, Khoong EC, Aguilera A, Sarkar U. Multilevel determinants of digital health equity: a literature synthesis to advance the field. *Annual review of public health*. 2023 Apr 3;44:383-405.
15. Jahnelt T, Dassow HH, Gerhardus A, Schütz B. The digital rainbow: Digital determinants of health inequities. *Digital Health*. 2022 Oct;8:20552076221129093.
16. Rovetta A, Castaldo L. Are we sure we fully understand what an infodemic is? A global perspective on infodemiological problems. *Jmirx med*. 2022 Jul 21;3(3):e36510.
17. Fridman I, Johnson S, Elston Lafata J. Health Information and Misinformation: A Framework to Guide Research and Practice. *JMIR Med Educ*. 2023 Jun 7;9:e38687. doi: 10.2196/38687. PMID: 37285192; PMCID: PMC10285617.
18. Yang K-C, Pierri F, Hui PM, et al. The COVID-19 infodemic: Twitter versus Facebook.

- Big Data Soc. 2021;8(1): 20539517211013861.
19. Chowdhury N, Khalid A, Turin TC. Understanding misinformation infodemic during public health emergencies due to large-scale disease outbreaks: a rapid review. *Journal of Public Health*. 2023 Apr;31(4):553-73.
 20. Stimpson JP, Ortega AN. Social media users' perceptions about health mis- and disinformation on social media. *Health Aff Sch*. 2023 Oct;1(4):qxad050. doi: 10.1093/haschl/qxad050. Epub 2023 Sep 26. PMID: 38107206; PMCID: PMC10722559.
 21. Suarez-Lledo V, Alvarez-Galvez J. Prevalence of Health Misinformation on Social Media: Systematic Review. *J Med Internet Res*. 2021 Jan 20;23(1):e17187. doi: 10.2196/17187. PMID: 33470931; PMCID: PMC7857950.
 22. Oh SH, Lee CJ, Park A. Trust Matters: The Effects of Social Media Use on the Public's Health Policy Support Through (mis)beliefs in the Context of HPV Vaccination. *Health Commun*. 2023 Dec;38(12):2628-2639. doi: 10.1080/10410236.2022.2096985. Epub 2022 Jul 19. PMID: 35850554.
 23. Nan X, Wang Y, Thier K. Why do people believe health misinformation and who is at risk? A systematic review of individual differences in susceptibility to health misinformation. *Soc Sci Med*. 2022 Dec;314:115398. doi: 10.1016/j.socscimed.2022.115398. Epub 2022 Oct 21. PMID: 36327631.
 24. Park S, Massey PM, Stimpson JP. Primary Source of Information About COVID-19 as a Determinant of Perception of COVID-19 Severity and Vaccine Uptake : Source of Information and COVID-19. *J Gen Intern Med*. 2021 Oct;36(10):3088-3095
 25. Perlis RH, Lunz Trujillo K, Green J, et al. Misinformation, Trust, and Use of Ivermectin and Hydroxychloroquine for COVID-19. *JAMA Health Forum*. 2023;4(9):e233257. doi:10.1001/jamahealthforum.2023.3257
 26. Morgan JC, Cappella JN. The Effect of Repetition on the Perceived Truth of Tobacco-Related Health Misinformation Among U.S. Adults. *J Health Commun*. 2023 Mar 4;28(3):182-189. doi: 10.1080/10810730.2023.2192013. Epub 2023 Mar 20. PMID: 36938585.
 27. Nguyen V, Testa L, Smith AL, Ellis LA, Dunn AG, Braithwaite J, Sarkies M. Unravelling the truth: Examining the evidence for health-related claims made by naturopathic influencers on social media - a retrospective analysis. *Health Promot Perspect*. 2022 Dec 31;12(4):372-380. doi: 10.34172/hpp.2022.49. PMID: 36852198; PMCID: PMC9958238.
 28. Diekman C, Ryan CD, Oliver TL. Misinformation and Disinformation in Food Science and Nutrition: Impact on Practice. *J Nutr*. 2023 Jan;153(1):3-9. doi: 10.1016/j.tjn.2022.10.001. Epub 2022 Dec 22. PMID: 36913465.
 29. Stimpson JP, Park S, Pruitt SL, Ortega AN. Variation in Trust in Cancer Information Sources by Perceptions of Social Media Health Mis- and Disinformation and by Race and Ethnicity Among Adults in the United States: Cross-Sectional Study. *JMIR cancer*. 2024 May 8;10(1):e54162.
 30. Southwell BG, Otero Machuca J, Cherry ST, Burnside M, Barrett NJ. Health Misinformation Exposure and Health Disparities: Observations and Opportunities. *Annual review of public health*. 2023 Apr 3;44:113-30.
 31. Gurgun S, Cemiloglu D, Close EA, Phalp K, Nakov P, Ali R. Why do we not stand up to misinformation? Factors influencing the likelihood of challenging misinformation on social media and the role of demographics. *Technology in Society*. 2024 Mar 1;76:102444.
 32. Scott CF, Bay-Cheng LY, Prince MA, Nochajski TH, Collins RL. Time spent online: Latent profile analyses of emerging adults' social media use. *Comput Human Behav*. 2017 Oct;75:311-319. doi: 10.1016/j.chb.2017.05.026. Epub 2017 May 18. PMID:

- 34334933; PMCID: PMC8319841.
33. Malhotra K, Kempegowda P. Appraising unmet needs and misinformation spread about polycystic ovary syndrome in 85,872 YouTube comments over 12 years: big data infodemiology study. *Journal of Medical Internet Research*. 2023 Sep 11;25:e49220.
 34. Pagoto SL, Palmer L, Horwitz-Willis N. The Next Infodemic: Abortion Misinformation. *Journal of Medical Internet Research*. 2023 May 4;25:e42582.
 35. Richmond J, Anderson A, Cunningham-Erves J, Ozawa S, Wilkins CH. Conceptualizing and Measuring Trust, Mistrust, and Distrust: Implications for Advancing Health Equity and Building Trustworthiness. *Annual Review of Public Health*. 2024;45.
 36. Ognyanova K, Lazer D, Robertson RE, Wilson C. Misinformation in action: Fake news exposure is linked to lower trust in media, higher trust in government when your side is in power. *Harvard Kennedy School Misinformation Review*. 2020 Jun 2.
 37. Stimpson JP, Park S, Pruitt SL. Trusting information on cancer varies by source of information and political viewpoint. *Cancer Causes & Control*. 2024 Jan;35(1):177-84.
 38. Boulianne S, Humprecht E. Perceived Exposure to Misinformation and Trust in Institutions in Four Countries Before and During a Pandemic. *International Journal of Communication*. 2023 Feb 26;17:24.
 39. Stella Juhyun Lee, Chul-Joo Lee, Hyunjung Hwang, The impact of COVID-19 misinformation and trust in institutions on preventive behaviors, *Health Education Research*, Volume 38, Issue 1, February 2023, Pages 95–105, <https://doi.org/10.1093/her/cyac038>
 40. Santirocchi A, Spataro P, Alessi F, Rossi-Arnaud C, Cestari V. Trust in science and belief in misinformation mediate the effects of political orientation on vaccine hesitancy and intention to be vaccinated. *Acta Psychologica*. 2023 Jul 1;237:103945. <https://doi.org/10.1016/j.actpsy.2023.103945>
 41. Hameleers, M., Brosius, A., & de Vreese, C. H. (2022). Whom to trust? Media exposure patterns of citizens with perceptions of misinformation and disinformation related to the news media. *European Journal of Communication*, 37(3), 237–268. <https://doi.org/10.1177/02673231211072667>
 42. Tabler J, Snyder JA, White C, Freng A, Thunström L. COVID-19 health practices and attitudes in the United States: the role of trust in healthcare. *Journal of Public Health*. 2023 Oct;31(10):1631-44.
 43. Kirby JB, Taliaferro G, Zuvekas SH. Explaining racial and ethnic disparities in health care. *Medical care*. 2006 May 1;64:72.
 44. Saeed SA, Masters RM. Disparities in health care and the digital divide. *Current psychiatry reports*. 2021 Sep;23:1-6.
 45. Bailey R, Sharpe D, Kwiatkowski T, Watson S, Dexter Samuels A, Hall J. Mental Health Care Disparities Now and in the Future. *J Racial Ethn Health Disparities*. 2018 Apr;5(2):351-356. doi: 10.1007/s40615-017-0377-6. Epub 2017 Jun 20. PMID: 28634875.
 46. Freelon D, Bossetta M, Wells C, Lukito J, Xia Y, Adams K. Black trolls matter: Racial and ideological asymmetries in social media disinformation. *Social Science Computer Review*. 2022 Jun;40(3):560-78.
 47. Klein A. Slipping racism into the mainstream: A theory of information laundering. *Communication Theory*. 2012 Nov 1;22(4):427-48.
 48. Volpe VV, Hoggard LS, Willis HA, Tynes BM. Anti-Black Structural Racism Goes Online: A Conceptual Model for Racial Health Disparities Research. *Ethn Dis*. 2021 May 20;31(Suppl 1):311-318. doi: 10.18865/ed.31.S1.311. PMID: 34045833; PMCID: PMC8143849.
 49. Richardson A, Allen JA, Xiao H, Vallone D. Effects of race/ethnicity and socioeconomic

- status on health information-seeking, confidence, and trust. *Journal of Health Care for the Poor and Underserved*. 2012;23(4):1477-93.
50. Fareed N, Swoboda CM, Jonnalagadda P, Walker DM, Huerta TR. Differences Between Races in Health Information Seeking and Trust Over Time: Evidence From a Cross-Sectional, Pooled Analyses of HINTS Data. *Am J Health Promot*. 2021 Jan;35(1):84-92. doi: 10.1177/0890117120934609. Epub 2020 Jun 26. PMID: 32588638
51. National Cancer Institute. Health Information National Trends Survey 6 (HINTS 6) Methodology Report. April 2023. <https://hints.cancer.gov/data/methodology-reports.aspx>
52. Bazargan M, Cobb S, Assari S. Discrimination and medical mistrust in a racially and ethnically diverse sample of California adults. *The Annals of Family Medicine*. 2021 Jan 1;19(1):4-15.
53. Fiala MA. Discrimination, medical mistrust, and delaying cancer screenings and other medical care. https://doi.org/10.1200/OP.2023.19.11_suppl.15
54. Maitland A, Lin A, Cantor D, Jones M, Moser RP, Hesse BW, Davis T, Blake KD. A Nonresponse Bias Analysis of the Health Information National Trends Survey (HINTS). *J Health Commun*. 2017 Jul;22(7):545-553. doi: 10.1080/10810730.2017.1324539. Epub 2017 May 30. PMID: 28557627; PMCID: PMC6114127.
55. Smailhodzic E, Hooijsma W, Boonstra A, Langley DJ. Social media use in healthcare: A systematic review of effects on patients and on their relationship with healthcare professionals. *BMC Health Serv Res*. 2016 Aug 26;16(1):442. doi: 10.1186/s12913-016-1691-0. PMID: 27562728; PMCID: PMC5000484.
56. Ukoha C, Stranieri A. On the value of social media in health care. *Journal of Technology in Behavioral Science*. 2021 Jun;6(2):419-26.
57. Hilghman I. Social Media Education for Transition to Practice Programs. *J Nurses Prof Dev*. 2019 May/Jun;35(3):163-166. doi: 10.1097/NND.0000000000000546. PMID: 31045969.